All you want to know about the BBC MICRO!

# THE Number 1 March 1984 E1 MICRO USER



## Mazemunch!

Full listing of the classic arcade game



Help us celebrate our first birthday

and test YOUR
 skill at lighting
 the candle



32-page guide to using discs on the BBC Micro

## Software for the BBC micro











The Graphic Extension ROM

Our latest utility ROM includes over 28 new graphics related commands. These can be typed in like any normal commands and can of course, be included in BASIC programs. The commands are split into 3 distinct areas:-

- Sprite graphics
  - These are multi-coloured shapes up to 24 x 24 pixels in size.
  - Once a sprite has been designed (using in-built routine) it can be plotted at any position on the screen and easily moved around. A sprite can also be part of a 'film' a sequence of frames allowing animation. Up to 32 sprites or 'films' can be active on the screen at any time. A 'film' can contain up to 47 frames, each frame being any sprite image.
- 2. LOGO 'turtle' graphics
  - By using simple FORWARD, BACKWARD, LEFT and RIGHT commands a 'turtle' can be moved very quickly around the screen, producing intricate patterns by the most user-friendly means. Including these commands in structured BBC BASIC programs provides a system faster and more powerful than many of the packages currently used to demonstrate the LOGO language.
- 3. The third section consists of a large number of general purpose commands, such as:-
  - ★FILL which will fill ANY area on screen.

Fast circle and arc drawing

3D graphics routines allowing X, Y, Z co-ordinate plotting

Large character printing in a range of patterns

Scaling — allowing any part of the screen to be expanded or diminished

A rotate command that will rotate all plotting by any angle around the origin

Because this is a ROM, all the commands are instantly available, and has a built-in help menu showing the syntax of all commands. Supplied with a comprehensive manual and step-by-step fitting instructions, suitable even for the inexperienced. This ROM represents extremely good value for money.

Available directly from us, mail order only, or from all good dealers

£28.00 plus £1.00 p&p plus VAT







#### **GRUNDIG 14" TV/MONITOR** + REMOTE CONTROL

RGB input for a super clear display. The picture must be seen to be believed. We have not seen better colour on any dedicated monitor.



ORDER TODAY, we guarantee that you will not be disappointed. And remember, when you finish computing, just flick the switch and you have a super quality 14" colour TV - what better way to justify the expense to your wife or girlfriend!

Complete with lead for BBC for only

£309 inc VAT

Turn your BBC into a powerful business system with the NEW Torch Z80 2nd Processor Board includes additional 64K RAM PLUS Free Software Valued at over £1,100. - ONLY £429 inc. VAT.

Software includes:

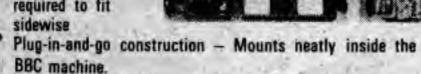
- \* Perfect Writer
- \* Perfect Speller
- \* Perfect Calc
- Perfect Filer
- \* Torch Net
- Commanex Business Games

ORDER NOW. And receive our Enhanced Utilities Disc. Many additional and useful programs included.

HURRY - limited numbers available.

#### SIDEWISE Rom Expansion 🗕 Board

- Full sidewise Rom Expansion to 16 Roms
- 16K Battery backed CMOS Ram option No soldering
- required to fit sidewise



Full buffering of address and data busses - prevents data bus loading problems associated with unbuffered

Pin1 of on board sockets are connected properly - No spurious crashes due to this known fault on BBC

Existing sockets on BBC are usable. All eprom sockets are accessible without removing sidewise.

> ONLY £43.70 + £1.00 carriage

TORCH Z80 DISC PACK with over £1,100 of software FREE



NOW ONLY £835 inc. vat

Free carriage UK only

Software includes: \* PERFECT WRITER \* PERFECT SPELLER \* PERFECT CALC \* PERFECT FILER \* TORCH NET \* Comanex — The

Interactive Management Game. Approved and used by leading management consultants. The TORCH Z80 DISC PACK is the most powerful BBC Disc upgrade available, it provides 800K of storage plus a Z80 Second Processor running Torches own CP/M compatible operating system over 200 packages now available - discs can also be used for storage under Acorn D.F.S. system.

Clip this ad to your order to receive free 40/80 T convertor program.

BBCING	TAV
THE CONTRACTOR OF THE PROPERTY	9.00
BBC Model B	9.00
	9.00
BBC Disc Upgrade 8	7.00
BBC A-B Full Upgrade9	5.00
BBC Teletext Receiver	
BBC Z80 2nd Processor	
BBC 6502 2nd Processor	
DISC DRIVESINC	
	5.00
LVL Expansion Drive 14	9.00
LVL Dual x 100K Drive 38	
Pace Single 100K 21	2.25
	9.95
Pace Dual 100K	9.95
Pace Duel 40/80T D/Sided	4.95
	0.00
Torch Dual 400K Z80 Disc Pack 83	5.00
Opus Single 100K 17	9.95

#### ORDER A COMPLETE SYSTEM -GET ALL LEADS FREE

	_
MONITORSIN	CVAT
Microvitec 14" Colour 24	17.00
Sanyo 14" Colour	37.00
Fidelity 14" Colour Monitor	29.00
Grundig 14" Colour TV/Monitor 28	39.00
Sanyo 12" Green Screen	39.00
Phoenix 12" Hi-Res Amber 12	29.00
PRINTERSIN	CVAT
Epson RX80 26	39.00
Epson RX80	9.00
Epson FX80	25.00
Epson FX100 *NEW 56	39.00
Star Gemini 10X 24	19.95
Shinwa CP80 22	29.00
Juki 6100 Daisywheel 44	
MISCELLANEOUSIN	CVAT
Sanyo DR101 Data Recorder	19.95
Cassette Leads - all types	3.90
Acorn Joysticks	3.00
Quickshot Joystick	9.95
Printer Cable (parallel) 1.2 m 1	3.00
BBC Deluxe Dustcover	5.95
Light Pen	28.95
The Plug Power Filter	4.95
ATPL Rom Expansion Board	13.70
Wordwise	
View	
Disc Doctor	12.55
Graphics Rom	
Pace DFS	
HCCS Forth	
HCCS Logo Forth	
HCCS Pascal	7.00
HCCS Excal	
LVL LDOS Double Density 8	39.00
DFS Enhancer 1	8.50
BOOKS NO	TAV
30 Hour Basic	5.95
A.L.P. for BBC Micro	8.95
BBC Micro Disc Companion	7.05
Basic Programming on the BBC Micro	5.05
Creative Graphics	
Graphs & Charts	
Lisp Manual	7.50
Forth Manual	7.50
BCPL Manual 1	5.00
30 Programmes for BBC	4.95
100 Programmes for the BBC Micro	
Discovering BBC Machine code	
21 Games for the BBC	3.35
The Book of Listings	3./5 B 05
The Computer Book	6.75
Programming the BBC Micro	5.95
Using Floppy Discs with the BBC Micro	9.95
Creating Adventure Games on the BBC	6.95
Games BBC Computers Play	

#### WE ACCEPT INSTITUTIONAL AND EDUCATIONAL ORDERS

ALLIGATA	NC VAT
Contract Bridge	
Bug Blester	7 10 20 20 20 20 20 20 20 20 20 20 20 20 20
Dam Busters	. 7.95
Eagle Empire	N 0.38
Neanderthal Man	1.92.22
Primary Art	200

PROGRAM POWERINC VAT
Killer Gorilla 7.95
Chess B 7.95
Cybertron Mission 7.95
Croaker
Danger UXB
Escape Moonbase Alpha 7.95
Felix in the Factory 7.95
Felix & the Fruit Monsters 7.95
Hell Driver 7.95
Swoop 7.95
Chemistry 6.85
Positron 7.95
Physics 6.85
Demon Decorator 6.85
Alien Swirl 7.95
Alien Destroyers
Martian Attack
Moon Raider 7.95
Labyrinths of LaCoshe 7.95
Zarrm
SUPERIOR SOFTWARE INC VAT
Colditz Adventure
Galaxians 7.95
Road Runner 7.95
Hunchback 7.95
Pontoon 7.95
2002 7.95
Gideons Gamble 7.95
Lunar Mission 7.95
Lost City 7.95
DYNA-BYTEINC VAT
Pool
COMPUTER CONCEPTSINC VAT
Logo-2
OPUSINC VAT
Dogfight 9.95
BUG-BYTEINC VAT
Sea Lord
Twin Kingdom Valley
Twin Kinggom valley

RING FOR LATEST PRICES, MANY REDUCTIONS EXPECTED	
BBC/ACORNSOFT (A Selection) INC V	ΔT
Algebraic Manipulation 9.5	95
Arcadians 9.0	95
Business Games 9.5	
Castle of Riddles 9.5	
Creative Graphics 9.5	
Countdown to Doom	
Forth 18.	35
Graphs and Charts	
Hopper	_
Lisp	30
Missile Base 9.	
Meteors 9.5	
Monsters 9.5	
Pseko Computer	
Planetoid	
Rocket Raid 9.5	95
Snooker 9.5	35
Sphinx Adventure 9.5	
Starship Command 9.5	
Tree of Knowledge 9.5	
Snapper 9.5	
View	JU
Speech Kit	10
Draughts and Reversi	30
Wardhunt 9.5	15
White Knight II 11.5	SÕ
Vutype	00
Tax Calc	
Beyond Basic 10.0	
Toolbox 10.0	10
Canyon 10.0	00
Record Keeper	00
Doctor Who	10
SOFTWARE INVASIONINC V	M
3D Bomb Alley	
Gunsmoke	10
Vortex 7.5	35
VISIONINC V	AT
Snooker 7.5	
Daredavil Dennis 7.5	35
PSIONINC V	AT

A SMALL SELECTION FROM **OUR VAST RANGE** 

Saloon Sally ..... 7.95

VuCalc ...... 14.95

VuFile ...... 14.95

MELBOURNE HOUSE ..... INC VAT The Hobbit ...... 14.95

CLARES	INC VAT
Graphkey	7.95
Replice (Disc Only)	9.95
Granh Dine	12 QE
The Key (Disc Only)	12.95
Single Key Entry	4.95
Shadow/Inspector	7.95
State 40/80T for Discs	
DR SOFT	INC VAT
747 Flight Simulator II	8.95
AMCOM	INC VAT
Space Highway	8.95
GEMINI GAMES	INC VAT
Missile Control	
Liberator	
Catarpillar	
GEMINI	
Cash Book Acc	95.00
Inv & Statements	19.95
Commercial Acc	19.95
Mailing List	19.95
Data Base	19.95
Stock Control	19.95
Home Accounts	19.95
SOFTWARE FOR ALL	INC VAT
Stock Control C/D	95/29.95
Invoicing/Statements C/D	5/29.95
Sales/Purchases C/D 19.6	35/29.95
	-

#### SAME DAY DESPATCH ON STOCK ITEMS

ADVENTURE INTERNATIONAL	INC VAT
Adventureland	9.95
Voodoe Castle	9.95
Secret Mission	9.95
Pirate Adventure	
SOFTSPOT	INC VAT
Transistors Revenge	
Heist	
AARDVARK	INC VAT
Zalaga	
WATFORD	
Pengo	
A&F	
Cylon Attack	
Checkie Egg	

MAIL DROER

COMPUTERAMA I Sash Street Stafford SI16 2PS the triegling your Areas of Barolaysand monther we will despare diately (0785) 41899

Call in today. Home Computer Centre for the BBC enthusiast. Send large SAE for further details of any product.



Micro's Monitors, Disc Drives,

CARRIAGE

BARCLAYCARD MSA

Printers £8.00. Books £1 each. Cassette Decks £2.00, Leads and software 50p/item, £1.50 max.

WE EXPORT WORLDWIDE Telex 36540 Hourds G.

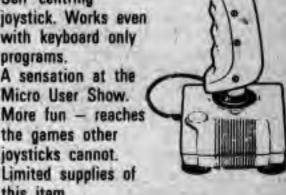
#### QUICKSHOT II **BBC JOYSTICK**

- Now with rapid

fire option Self centring joystick. Works even with keyboard only programs. A sensation at the Micro User Show. More fun - reaches the games other

joysticks cannot.

this item.



£19.95 + £1.00 p&p

#### STAFFORD

59 Foregate Street, Stafford, ST16 2PR. Tel: (0785) 41899

#### STOKE-ON-TRENT

11 Market Square Arcade, Hanley, Stoke-on-Trent, ST1 1PD.

Tel: (0782) 268620

#### SHREWSBURY

13 Castle Gates, Shrewsbury SY1 2AB. Tel: (0743) 60528



Vol. 2 No. 1 March 1984

Managing Editor Derek Meakin

Features Editor
Mike Bibby

Technical Editor

Mike Cook
Production Editor

Peter Glover

Layout Design

Heather Sheldrick

Advertisement Manager
John Riding

Advertising Sales

Mike Hayes

Marketing Manager
Sue Casewell

Editor-in-Chief of Database Publications: Peter F. Brameld

Tel: 061-456 8383 (Editorial) 061-456 8500 (Advertising)

Telex: 667664 SHARET G Prestel: 614568383

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Subscription rates for 12 issues, post free:

£14.50 - UK

£15 - Eire (IR £18)

£20 - Rest of world

(surface)

£65 - Rest of world (airmail)

ARC

Member of Audit Bureau of Circulations

The Micro User welcomes program listings and articles for publication. Material
should be typed or computer-printed, and
preferably double-spaced. Program listings should be accompanied by cassette
tape or disc. Please enclose a stamped,
self-addressed envelope, otherwise the
return of material cannot be guaranteed.
Contributions accepted for publication
will be on an all-rights basis.

c 1984 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles or listings.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

Distribution to the news trade in the UK and Ireland is by Wells Gardner, Darton and Co Ltd., Faygate, Horsham, West Sussex RH12 4SU (tel: Faygate 444). Enquiries regarding overseas distribution should be made direct to the publishers.

#### CONTENTS

#### **NEWS**

Keep in touch with the latest happenings in the eventful world of the BBC Micro.

40

#### BEGINNERS

Bring your micro to life with a touch of colour. We show you how simply it can be done.

#### **ONLY HUMAN**

The second part of our series on user-friendly programs, with the emphasis on education.

47

#### **NETWORK**

An economic and simple method of allowing several BBC Micros to share a disc unit.

52

#### COMPETITION

List eight ROMs in order of importance, and win them - plus a sideways ROM board.

55

#### DENARY DERRICK

Lots of fun and educational value in this simple number game for children.

57

#### WORKSHOP

Passing arrays to procedures is simplicity itself if you use our cunning techniques.

59

#### MAZEMUNCH

Tremendous fun for all in our explosive version of one of the great, all-time arcade hits.

64

#### SOUND ADVICE

We continue our series by explaining how to fully exploit the sound effects channel.

69

#### BIRTHDAY

Our anniversary game. Can you light the candle before you are blown out?

73

## 76

#### **ADVENTURES**

Our forthright columnist takes her usual critical look at the world of adventures.

## 113

#### RECOVERY

'Bad Program' messages? Why not use our invaluable program recovery routine?

## 116

#### SOFTWARESCENE

Our team of frank and thorough reviewers assess some of the latest software releases.

## 122

#### **BODY BUILDING**

A high speed A/D converter can turn your BBC Micro into an oscilloscope.

## 133

#### **HARDWARE REVIEW**

Our impartial experts give their assessment of new pieces of hardware for the BBC Micro.

### 141

#### **LIGHT PEN**

Single pixel resolution for light pens is now possible with our resolution revolution!

## 153

#### **TAPE & DISC OFFER**

Save yourself the chore of keying in programs with this month's cassette or disc.

## 154

#### **BACKISSUES**

Make sure your Micro User collection is complete. All you've missed and how to get it.

## 168

#### SUBSCRIBE NOW

A year's subscription to The Micro User will bring you a FREE Micro User cassette.

## 175

Don't miss our 32

page disc special -

essential reading for

anyone interested in

discs. We explain:

85 Verifying your programs

99 Saving screens on disc

PLUS an in depth survey

of disc drives available

for the BBC Micro - see

the centre pages.

88 Using the DFS commands

82 Discs for beginners

104 How discs work

109 Loading via a menu

#### MICROMAIL

The page you write yourself. Just a small selection from the flood of letters pouring in.



## OWN BUSINESS

Vu-Calc and Vu-File are two of our most powerful and popular Software packages that make practical and serious use of your BBC Microcomputer.

Whether you use them to help run your business or keep your household records and plans in order, Vu-Calc and Vu-File form essential Software that no serious BBC Micro user should be without.

Supplied on cassette they can be used with cassette or disk systems, and come with detailed user manuals. Vu-Calc and Vu-File are written in Machine code, and feature full on-screen prompting with Printers driven through either serial or parallel ports.

Vu-Calc and Vu-File require 32K RAM, and will operate with MOS 0.1, MOS 1.0, MOS 1.2 and BASIC 1 OR BASIC 2.

#### Vu-Calc—The Versatile Spreadsheet Programme

Vu-Calc is a sophisticated and powerful 'spreadsheet' programme that generates and calculates large tables of interdependent text, data and formulae.

Vu-Calc's grid has 52 rows x 28 columns available to the user and tables and reports can be printed, or stored on cassette or disk.

> Vu-Calc's applications include:— **Cashflow Projections** Home Finance Management Engineering and Statistical Tables Investment Forecasting **Business Planning Profit and Loss Statements Break Even Analysis** £14.95

The whole range of quality Psion Software, including the popular Vu-Calc and Vu-File applications programmes are available from W. H. Smith, Boots and all good software dealers.



#### Vu-File—The Complete Filing System

Vu-File is a powerful Data Base Management system for sophisticated electronic filing and manipulation of information of all kinds. Vu-File creates dedicated Data Bases to suit your requirements with a capacity for nearly 16,000 characters. Full on-screen prompting ensures ease of use.

> Vu-File's applications include: Catalogues of Stamps, Coins, Books, Records Etc... Names and Addresses Customer Accounts **Estate Agents Lists** Medical Records Club Memberships Records and Lists of all Kinds £14.95

Dealers are invited to contact Psion to find out details of substantial discounts for trade orders of our best selling software for the BBC Microcomputer.

## pSch electronics Ltc

5 THE PARADE, YATELEY

NEAR CAMBERLEY, SURREY

TEL: YATELEY 877222 FINISHED

## 3 3 G MICRO CENTRE

BBC		
BBC Model A	£299.00	
BBC Model B	£399.00	
BBC Model B + Disc/Int	£469.00	ĺ
BBC Disc Interface	£95.00	
Speech Interface	£54.00	
BBC Teletext Receiver		
View Word Processor		

#### BBC DISC DRIVES

Acorn/LVL single 100K drive	
(expands to double)	£240.00
Acorn/LVL dual 100K drive	£370.00
Pace single 100K drive	£210.00
Pace 200K drive	£250.00
Pace dual 100K drive	£370.00
Pace 40/80 switchable	£365.00
Pace dual 40/80 track switchable	e
double sided drive 800K	£670.00
Cumana 100K slim	£210.00
Cumana dual 100k slim	£375.00
Cumana Dual 200K slim	£485.00
LVL DD Disc Int Kit	£90.00
Pace Disc Int Kit	£95.00

#### **ACCESSORIES**

Cassette Recorder	£24.00
Cassette with Counter + Din	£29.00
Joysticks SW Self-Cen PR	£17.50
Joysticks Analogue PR	£17.50
Micro Dust Cover	£5.00
R.H. ELE Light Pen	€44.00
TV Aerial/Computer Switch	£2.50
Plinth for Monitor	£18.50

#### GEMINI **Business/Games**

Cash Book Acc	€95.00
Beeb Calc	£19.95
Inv. & Statements	£19.95
Commercial Acc	£19.95
Mailing List	£19.95
Database	£19.95
Stock Control	£19.95
Home Accounts	£19.95
Word Processor	£19.95
Liberator	€9.95
Missile Control	£9.95
Add £5 for disc versions	

ACCINISON	
Business Games	£9.95
Tree of Knowledge*E	29.95
Peeko-Computer/Manual	29.95
Algebraic Manipulation	29.95
Creative Graphics Cassette *E	€9.95
Graphs and Charts Cassette *E	£9.95
Desk Diary/Manual	29.95
Lisp Cassette*E	£16.85
Forth Cassette*E	£16.85
Philosophers Quest	£9.95
Sphinx Adventure	€9.95
Castle of Riddles	29.95
Monsters*E	£9.95
Snapper*E	€9.95
Planefold	29.95
Arcade Action	£11.90
Rocket Raid	€9.95
Meteors*E	£9.95
Arcadians*E	€9.95
Sliding Block Puzzles	€9.95
Cube Master	29.95
Super Invaders	£9.95
Missile Base	£9.95
Starship Command*E	£9.95
Countdown/Doom	£9.95
Snooker	€9.95
Number Balance	£9.95
Word Sequencing	£9.95
Word Hunt	£9.95
Missing Signs	£9.95
Draughts & Reversi*E	£9.95
JCB Digger	£9.95
Hopper*E	£9.95
Chess*E	£9.99

#### SOFTWARE INVASION

BBC SOFTWAR	
Attack on Alpha Centruri	£7.95
Gunsmoke	£7.95
Vortex	£7.95
3D Bomb Alley	£7.95

White Knight - Chess	£11.50
Dr Who	29.99
Tool Box	£21.00
Beyond Basic	£11.50
Home Finance	29.99
Record Keeper	29.99

#### SOFTWARE FOR YOUR BBC MICRO

MICROPOWER	
Moon Base Alpha*E	£7.95
Moon Raider*E	£7.95
Nemisis	£7.95
Timetrek	£7.95
Galactic Commander	£7.95
Asteroid Storm	£7.95
Swoop*E	£7.95
Alien Swirl	£6.95
Laser Command	€7.95
Space Jailer	£6.95
Martian Attack	£7.95
Positron*E	€6.95
Zarm	£7.95
Intergalactic Trader	8.95
Cosmic Combat	£6.95
Cybertron Mission*E	£7.95
Bumble Bee	£7.95
Caveman Adventure	€6.95
Felix + The Fruit Monsters*E	£7.95
Bandits at 3 o'clockE	€6.95
Labyrinths of Lacoshe	£7.95
Croaker*E	€7.95
Danger UXB	£7.95
Cowboy Shootout	€6.95
Chess*E	£7.95
Killer Gorilla*E	£7.95
Hell Driver	£7.95
Demon Decorator	£6.95
Draughts	£6.95
Felix in the Factory*E	£7.95
Chemistry	€6.95
Constellation	£6.95
Physics	£6.95
World Geography	£6.95
Where	£6.95
Draw	£9.95
Dian managemental management	20,00

#### **MONITORS CTV**

Microvtec 14" colour	£240.00
Sanyo 14" colour	£240.00
Sanyo 12" green	£90.00
Philips 14" colour TV	£190.00
Ferguson 14" colour TV	£165.00

TO EDUCATION UTHORITIES FULL

#### **BUG BYTE**

€9.50
€9.50
£7.50
£7.50
£7.50
£7.50
£5.50
€9.50
£5.50
€9.50
£7.95
£7.95

£7.95

£7.95

£7.95

£7.95 £7.95

£7.95

£29.00

#### Disc Doctor - ROM ..... DDIMTEDC

Wordwise word

Invaders .....

Space Fighter .....

Alien Dropout .....

Fruit Machine .....

Frogger ..... Road Runner .....

PRIMIERS	
Epson RX 80T	£280.00
Epson RX 80FT	£315.00
Epson FX 80	£420.00
Star Gemini 10X	£250.00
Star Delta	£399.00
Star DP515 136 col	£270.00
Silver Reed Ex43	£399.00
Juki 6100 Daisy Wheel	£399.00

processor - ROM ...... £40.00

Logo - ROM ...... £29.00



E For ELECTRON PLEASE STATE

#### BOOKS FOR YOUR BBC MICRO

Let your BBC Micro Teach you to Program	£6.45
Assembly Language Programming for BBC	CR 05
Advanced 6502 Programming	£10.25
The Book of Listings (BBC Publications)	£3.75
The Computer Book (BBC Publications)	£6.75
Creative Graphics (Acornsoft)	£7.50
Graphs and Charts (Acornsoft)	£7.50
Forth Manual (Acornsoft)	£7.50
Lisp Manual (Acornsoft)	£7.50
Programming the 6502	£7.50
Programming the 6502	£9.95
6502 Software Design	£10.25
Easy Programming for BBC Micro	£5.95
35 Educational Programs for BBC Micro	£6.95
Further Programming for BBC Micro	£5.95
Programming for BBC Micro	£6.50
Basic Programming on the BBC Micro	£5.95
21 Games for the BBC Micro	£5.95
30 Hour BASIC	£5.95
BBC Micro Revealed	£7.95
6502 Sub Routines	
Assy Lang Programming for BBC	
Discovering BBC Machine Code	
Sound and Graphics	
Sound and Graphics	21.00

#### CE-SAME DAY DESPATCH ON ITEMS IN STOCK

AGI MAIL OLI	TIOL CAME DAI DEGLATOR ON THE	
MAIL ORDER COUPON		
Please send me:		
1	4	
2	5	
3	6	
I enclose cheque /P.	O. for	
Or please debit my	Access/Barclaycard/Visa* (delete as applicable)	
Card Number	Expiry date	
Name		
Address		
Telephone	DAN ELECTRONICE LIMITED	

P&H ELECTRONICS LIMITED

Unit 3 · Hogwood Lane · Finchampstead · Berkshire RG11 4QW CARRIAGE COSTS - Micro's, Monitors, Disc Drives, Printers £7 Books, Cassette Decks, Leads, Software 50p each item. ACCESS, BARCLAYCARD VISA ORDERS WELCOME

Instant credit up to £1,000. Deposit 10%.

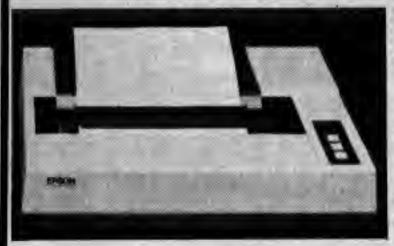
CREDIT FACILITIES



## **TECHNOMATIC**

## BBC Computer & Econet Referral Centre 01-452 1500 01-450 9764 01-450 6597 Telex 922800

#### **PRINTERS:**



We have selected a range of printers that will meet most requirements.

SEIKOSHA—ranging from a low-cost utility printer, right up to an advanced fourcolour printer.

EPSON—the high quality dot-matrix printers that set the standard in the industry—versatile printers that provide the optimum in performance

& reliability. The RX80/FT provides all standard printing & graphic functions, (single sheets & perforated paper), with the de-luxe FX80 giving in addition proportional printing,

italics, programmable characters etc. The FX100 also allows the use of 15" wide paper. The JUKI daisywheel provides a quality normally found in printers costing far more. Printer cables, interfaces, ribbons, paper etc. are all normally available from stock.



#### **DISC DRIVES:**

A full range of disc drives fitted with quality Japanese slimline mechanisms, (such as TEAC, MITSUBISHI etc.) are supplied ready to connect to your BBC, and come complete with necessary cables, formatting disc, manual etc. TEAC & MITSUBISHI mechanisms can operate in single and double density modes. The switchable disc drives give the user flexibility, by allowing access to both 40 & 80 Track discs. The 40/80 Track switching module can be simply attached to your standard 80 track drives thereby vastly increasing their versatility. For the serious user whose prime need is data storage, we can offer the KENDA PROFESSIONAL DMFS, which provides a genuine double density system. We also have a full range of diskettes, variety of disc storage cases, disc-drive cables. The **Floppiclene** head cleaning kit, is the

optimum performance of your drives. The use of disposable cleaning discs eliminate the risk of recontamination and abrasion, and ensure continuous data capture and transmission.



#### TORCH Z-80 Pack:

Your BBC computer can be converted into a business machine at a cost slightly higher than a 800K disc drive. The Torch pack with twin disc drive and a Z80A processor card greatly enhances the data storing and processing capability of the computer (NOTE: In BBC mode the disc pack functions as a normal BBC drive). Z80A card comes with 64K of RAM and a CP/M compatible operating system in ROM. The system is supplied complete with a BBC owner's user guide, a System/Demo disc, a PERFECT software package and COMANEX, a business management game. The PERFECT software package comprises of a DATABASE, CALC, WORD PROCESSOR and SPELLER commercially valued at over £1000. We are now supplying a Utility that enables software on 40 Track discs to be transferred to 80 Track discs £730.

NOW AVAILABLE – The TORCH Z80 SECOND PROCESSOR CARD – for those who already have suitable disc drives. The card is supplied with all the free software, as detailed above, presenting a very attractive package. £375.

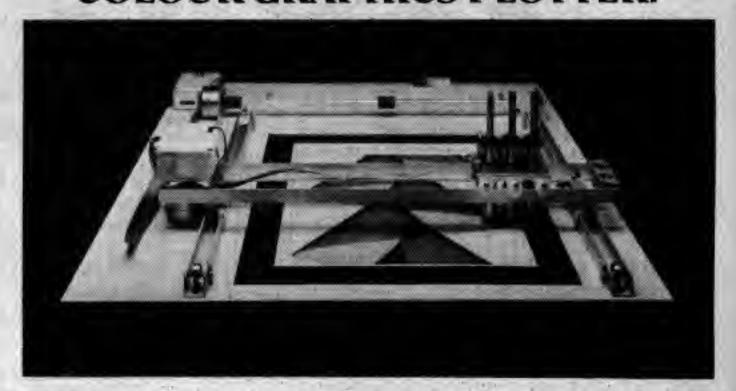
#### ACORN COMPUTER SYSTEMS BBC Model B. £348.00a BBC Model B+Econet . . . . . . . £389.00a BBC Model B+DFS. . . . . . . . . . £409.00a BBC Model B+DFS+Econet. £450.00a Acom Electron . . . . . . . . . £175.00a BBC Teletext Receiver. . . . . . . £195.00a BBC Dust Cover . . . . . . . . . . £4.00d Pair of Jovsticks . . . . . . . . £11.70c **TORCH Z80 SYSTEM** TORCH Z80 2nd Processor Card . . . £375.00a **UPGRADE KITS** A to B Upgrade Kit. . . . . . . . . . . £75.00d Installation . . . . . . . . . . . . £15.00 DFS Kit. . . . . . . . . . . . . . . . . . £84.00d Installation. . . . . . . . . . £15.00 Econet Kit. . . . . . . . . . . £45.00d Installation . . . . . . . . . . . . £25.00 Speech Kit £47.00d Installation . . . . . . . £10,00 ECONET ACCESSORIES Printer Server Rom ..... £41.00c File Server Level 1 ..... £86.00c File Server Level 2......£216.00b Clock + 2 Terminators . . . . . £85.00b Econet User Guide £10.00d **BBC FIRMWARE** 1.2 Operating System . . . . . . . . . . £7.50d Basic II Rom . . . . . . . . . . . . . . . . . £32.00d View Word Processor Rom . . . . . . £52.00c Wordwise W/P Rom ..... £32.00c Beebpen W/P Rom . . . . . . . . . . . . £29.00c BCPL ROM + Disc. . . . . . . . . . . £87.00b Pascal-T ROM.....£44.00c Disc Doctor Utility Rom....£30.00c Termi Emulator Rom......£29.00c Beebcalc Spreadsheet Rom .....£32.00c ULTRACALC Rom (BBC Publ.).....£65.00c Gremlin debug Rom.... £28.00c Computer Concepts Graphics Rom. . . . . £28.00c **BBC ANCILLARY HARDWARE** EPROM Programmer.... £79.50b Smartmouth Speech Synthesiser . . . . . £37.00b RH Light Pen ..... £39.50b "Time-Warp" Real-Time Clock/Calendar . . . . . . . . . . . . . . . . . £29.00b ACORN IEEE Interface ANKOI . . . . . . £282.00c TOOL KIT ..... £20.00d

EPSON RX-80 FT	£320.008
EPSON RX-80 FT	£250.00a
EPSON FX-100	£490.00a
NEC PC80 23BE-N	£310.00a
SEIKOSHA GP100A	
SEIKOSHA GP250X	£199.00a
SEIKOSHA GP700A Colour	£375.00a
JUKI 6100 Daisy wheel	£350.00a
MCP40 Col. Printer/Plotter	
Accessories:	£ 123,000
Parallel Printer Lead	C10.004
Parallel Printer Lead	£ 10.000
Serial Printer Lead	. £8.000
Epson Serial Interface 2K	. £60.00c
Epson Serial Interface	
NEC Serial Interface	
Epson Paper Roll Holder	
FX-80 Tractor Attachment	£37,00c
PAPER Fanfold 2000 sheets	£13.50b
Drinter Charer Parallel	
3 computers - 1 printer	£59.00c
Grafpad Graphics Tablet	£ 125 00e
GRAPHICS Plotter	
UNAF MOS Flotter	EZ I U.UUd
COLOUR/GREEN MONITORS (leads inc	(bl:
Microvitec 1431 14" RGB Std Res	
Microvitec 1431P 14" RGR/PAI Strl Res	£249 00a
Microvitec 1431P 14" RGB/PAL Std Res Microvitec 1431PS 14" RGB/PAL + Sound	
Microvitec 1431PS 14" RGB/PAL + Sound.	£259.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res	£259.00a £325.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res	£259.00a £325.00a £440.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 20" RGB Std Res	£259.00a £325.00a £440.00a £287.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res.	£259.00a £325.00a £440.00a £287.00a £230.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc)	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track).	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (40/80 Track).	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (80 Track) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £180.00a £260.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (80 Track) with psu. 400K (80 Track) by the su.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £185.00a £195.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (80 Track) with psu. 400K (80 Track DS). 2x100K (40 Track) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £195.00a £320.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (80 Track) with psu. 200K (80 Track) with psu. 200K (40/80 Track) with psu. 2x200K (40/80 Track) with psu. 2x200K (40/80 Track) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £185.00a £260.00a £320.00a £400.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (80 Track) with psu. 400K (80 Track DS). 2x100K (40/80 Track) with psu. 2x200K (40/80 Track) with psu. 2x200K (80 Track DS).	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £185.00a £260.00a £320.00a £400.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (40/80 Track) with psu. 400K (80 Track DS). 2x100K (40/80 Track) with psu. 2x200K (40/80 Track) with psu. 2x200K (80 Track DS). 2x400K (80 Track DS) with psu. 2x400K (80 Track DS) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £195.00a £320.00a £400.00a £420.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track) 100K (40 Track) with psu. 200K (80 Track) with psu. 200K (80 Track) with psu. 22200K (40/80 Track) with psu. 2x200K (40/80 Track) with psu. 2x200K (80 Track) with psu. 2x200K (80 Track DS). 2x100K (80 Track DS) with psu. 2x400K (80 Track DS) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £195.00a £400.00a £420.00a
Microvitec 1431PS 14" RGB/PAL + Sound. Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 20" RGB Std Res. KAGA Vision I 12" RGB Std Res. KAGA Vision III 12" RGB Hi Res. KAGA Vision III 12" RGB Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.  BBC COMPATIBLE 5.25" DISC DRIVES (All include cables, manual + format disc) 100K (40 Track). 100K (40 Track) with psu. 200K (40/80 Track) with psu. 400K (80 Track DS). 2x100K (40/80 Track) with psu. 2x200K (40/80 Track) with psu. 2x200K (80 Track DS). 2x400K (80 Track DS) with psu. 2x400K (80 Track DS) with psu.	£259.00a £325.00a £440.00a £287.00a £230.00a £385.00a £106.00a £99.00a £6.50d £3.50d £185.00a £185.00a £185.00a £195.00a £400.00a £420.00a

**PRINTERS & PLOTTERS** 

#### ALL PRICES EXCLUDE VAT. Please add carriage 50p

#### **COLOUR GRAPHICS PLOTTER:**



This robustly built 3-colour graphics plotter provides both versatility & precision. The carriage can be moved with an accuracy of 0.025cm. over an area the size of A4 paper. The plotter bed can accept paper & far thicker materials, at sizes of up to A3. The basic plotter carries three pens each of which is software selectable. Optional accessories that can be fitted include: Scriber, miniature drill, router, and optical sensor for scanning. This versatile plotter can provide an endless source of creative ideas.

## TECHNOMATIC

Our in depth stocks allow us to offer immediate deliveries on most items and our aim is to provide the best available products at competitive prices. In addition to the items listed above we carry extensive stocks of: connectors, connector assemblies, components including TTLs, CMOS, RAMs, EPROMs and CPUs. Spares for the BBC computers are normally available from stock. Orders from government departments, public bodies, hospitals, schools, colleges, universities and recognised PLCs welcome. We specialise in world wide exports. No VAT on exports. Our specially negotiated freight charges to many countries ensure the customer considerable savings on charges.

### Everything you need for your BBC Computer

Plus friendly service and professional advice

Double Disc Cable.	C8 504
DISCS 40T SS/SD Pkt of 10	C15.00c
DISCS 80T SS/DD Pkt of 10	
DISCS 40T DS/DD Pkt of 10	
DISCS 80T DS/DD Pkt of 10	
FLOPPICLENE Drive Head Cleaning	£20.00L
TO THE RESERVE OF THE PARTY OF	C14 50a
Kit Disc Library Case	C2 504
Disc File Case 30/40	
Disc Lockable Case 30/40	C16.000
Disc Lockable Case 60/70	C20.006
DISC LUCKADIE GASE DU/ /U	230.000
EPROMS:	
2764-250nS	
27128-300nS	£18.00
27128-250nS	£22.00
SOFTWARE:	
GEMINI BUSINESS including Database Ma	ail I let
Beebcalc, Beebpiot, Stock-Control, Home Ac	
Above on Cassette	
Above on Disc.	
CashBook on Disc	CE2.000
Cashbook/Final Accounts both	C02.006
GEMINI Leisure - Full Range	£02.000
TABS BUSINESS SOFTWARE FOR TORCI	
Sales Ledger (CP/N)	
Purchase Ledger (CP/N)	C00.00c
Mailing List (CP/N)	
ACORNSOFT - Full Range	£33.00C
ACORN LANGUAGES including BCPL, LIS	D
FORTH with Manuals	
BBCSOFT - Full Range	
PROGRAM POWER - Full Range	*****
ACORNSOFT (Electron) - Full Range	
BEEBUGSOFT - Full Range	*****
CASSETTE RECORDERS:	22.220
SANYO DR 101 Data Recorder	
Datex Slim Line	
BBC Tape Recorder	
Cassette Lead	£3.00d
HOBBIT Floppy Tape	£135.00b
HOBBIT Zero Memory Option	
Computer Grade C-12 cassette	
Computer Grade Cassette 10 off	
Phillips Mini-data cassette	£3.00d
BBC BOOKS (NO VAT) p&p £1.50/boo	
Advanced User Guide (p&p £2).	£12.05
Advanced 6502 Assy Lang Prog	£10.35
CP/M Handbook	
OF / MI MIGHUUUUW	P10.10

Micros Interfacing Techniques £13.05	1
Programming the 6502£9.75	MA
6502 Applications £9.75	R
BBC Computer Books	
Assembly Lang Prog for BBC Birnbaum £8	.95
Assembly Lang Programming on BBC Micro	150
by Ferguson and Shaw	£7.95
Basic Prog for BBC	£5.95
BBC an Expert Guide	
Micro Revealed	£7.95
Easy Programming on BBC	
Further Programming on BBC	. £5.95
Games BBC Computer Play	£6.95
Introducing BBC Micro	£5.95
Let Your BBC Teach You	£6.45
Programming The BBC	£6.50
30 Hour Basic.	£5.95
35 Educational Programs	£6.95
BBC Sound & Graphics	£7.95
Creating Adventure Programs	£6.95
Discovering Machine Code	£6.95
Structured Programming	£6.50
Assembly Language Shiva	£7.95
6502 ALP	
Using the 6502 Ass Lang	
6502 Machine Code for Beginners	
6502 Software Design	
BBC Basic (Melbourne)	
ALP on BBC Addison	
BBC Graphics and Sound	
Advanced Prog Techniques	
Programming the Z80	
Forth Acom	£7.50
Using Floppy Disk with the BBC Micro	
Computer Cumana	£7.50
BCPL User Guide Acom (p&p £2)	
LISP Acom	
Creative Graphics Acorn	
Graphs and Charts Acorn	. £7.50
The Friendly Computer Book BBC	£4.50
Beyond Basic BBC	£7.25
Into View BBC Word Processor	
Acom	. £2.50
Advanced 6502 Interfacing	£10.95
Electron	07.05
Start Programming with the Electron	£7.95
Assembly Language Programming on the	07.00
Electron	£7.95
The Electron Book	£7.95
Basic Sound and Graphics	00.00
6522 Book	£3.25

unless indicated as follows: (a) £7 (b) £2.50 (c) £1.50 (d) £1.00

#### SANYO DR101

Data Recorder. An advanced data recorder that consistently achieves superior performance.

#### **MONITORS:**

MICROVITEC-a range of British Made DTI/ACORN approved Std/Med/Hi-resolution RGB colour monitors that have a consistent, reliable performance. Also available in RGB/ PAL/SOUND versions. The KAGA range



provides a similar performance in 12" screen format. Our Japanese manufactured Hi-Res green screen SANYO is an ideal solution for high clarity 80 column text display. The KAGA green screen, with its 'chemically etched' anti-glare screen for the discerning user. All monitors are supplied with suitable leads at no extra charge.

> MAIL ORDERS TO: 17 Burnley Road, London NW10 1ED (Tel: 01-452 1500, 01-450 6597 Telex 922800)

SHOPS AT: NW London: 15 Burnley Road, London NW10 IED (Dollis Hill 2 mins walk, ample car parking space) West London: 305 Edgware Road, London W2, Tel: 01-723 0233 (Near Edgware Road )

#### NY MORE OOKSIN STOCK

#### **ACORN IEEE INTERFACE**

A full implementation of the IEEE488 standard, providing computer control of compatible scientific & technical equipment, at a lower price than other systems. Typical applications are in experimental work in academic and industrial laboratories. Phone for details. £282.

#### TELETEXT

Converts your BBC into a fully fledged Teletext Terminal. In addition to normal reception of Teletext pages, it is able to 'download' software as well as saving standard pages on any of the four TV channels. £196.

#### ULTRACALC

With advanced features, such as: \*Handling of labels as well as numbers, as values, allowing the search of a list by a meaningful name, instead of just a number. \*Efficient memory usage allowing large spreadsheets to be constructed. \*Variable width columns.

It helps you to create and manipulate \*Budgets \*Cash-Flow forecasts \*Price Lists \*Balance Sheets \*Time Sheets \*Order Entry \*Small Databases \*Scientific Calculations etc. £65.

#### MICROTEXT

Developed by the National Physical Laboratory, is a programming system designed to simplify the production of a wide range of man-computer dialogues. Using MICROTEXT, an expert in any field can construct their own complete courses of computer-based instructional material. Applications include interviewing systems, teaching packages, training courses and interactive demonstrations and simulation. £43.35p

#### RH LIGHTPEN:

The Acorn-approved superior design, with a programmable 'push tip' switch, status indicator LED and an interface box. Supplied complete with manual, full software and basic demo programs. Colour graphics programs will be available separately.

#### INSTITUTIONS & EDUCATIONAL **ESTABLISHMENTS**

Our bulk purchasing power enables us to provide very competitive quotations, as well as being able to supply in quantity, a very wide range of equipment, accessories and spare parts from stock.

#### **GRAFPAD**

A low cost graphic-tablet offering the performance and durability required for the business, industrial and educational user. It is small, accurate & reliable. Working area: 240 x 192mm + Menu area. £125.

### TECHNOMATIC LTD.

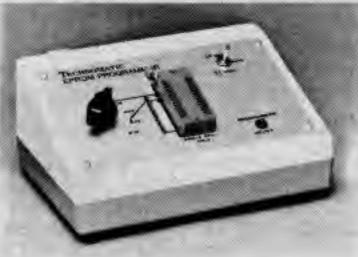
All prices exclude carriage & VAT. Please add carriage as indicated and add 15% VAT to the total order value. For fast delivery telephone your order quoting VISA or Access card or official order number. (Minimum telephone order £5).

## TECHNOMATIC

**BBC Computer & Econet Referral Centre** 01-452 1500 01-450 9764 01-450 6597 Telex 922800

#### **EPROM PROGRAMMER:**

A fully self-contained mains-powered eprom programmer housed in an attractive finished case. It is able to program 2716, 2732/32A, 2764 & 27128's in a single pass. It is supplied with vastly superior software when compared to any currently available similar programmer. In addition to



normal eprom programming, you are now able to load your favourite basic programs onto eprom.

Menu Driven Software provides user friendly options for programming the eprom with:

a) Basic programs.

b) Ram resident programs.

c) Any other program.

Programmer can read, blank-check, program & verify at any address/addresses on the Eprom.

Personality selection is simplified by a single rotary switch.

Programming voltage selector switch.

Full Editor with ASCII Disassembler, allowing direct modification of memory data in HEX or ASCII.

Continuous display of time left for completion of programming.

\* Continuous display of current addresses as they are being programmed.

The programmer comes complete with cables, software & operating manual.

£89 + £2.50 carriage. Software on disc £2 extra.

#### **SMARTMOUTH:**

WITH AN INFINITE VOCABULARY-A ready built speech synthesiser unit, allowing the creation of any English word, with both ease and simplicity, while, at the same time being very economical in memory usage. You can easily add speech to



carriage.

most existing programs. Due to its remarkable infinite vocabulary, Its uses spread throughout the whole spectrum of computer applicationsthese include industrial, commercial, educational, scientific, recreational etc. No specialist installation-simply plugs into the user port-and due to the simple software, no ROMS are needed. SMARTMOUTH is supplied with demo and development programs on cassette, and full software instructions. £37+ £2.50 carriage.

#### 'TIME-WARP' REAL-TIME-CLOCK/CALENDAR

A low cost unit that opens up the total range of Real-Time applications. With its full battery backup, possibilities include an Electronic Diary, continuous display of 'on-screen' time and date information automatic document dating, precise timing & control in scientific applications, recreational use in games etc-its uses are endless and are simply limited by one's imagination. Simply plugs into the user portno specialist installation required-No ROMS. Supplied with extensive applications software. Please phone for details. £29.00 + £2.50

#### **EPROM ERASERS**



UV1T Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. £59 + £2 p&p. UV1 as above but without the timer. £47 + £2 p&p.

#### BEEBUGSOFT

A professional range of Firmware/Software to suit both the advanced programmer and the user. From the well known 'EXMON' and 'TOOLKIT' to the WORDWISE SPELLCHECK.

> MAIL ORDERS TO: 17 Burnley Road, London NW 10 1FD (Tel: 01-452 1500, 01-450 6597 Telex 922800)

SHOPS AT: NW London: 15 Burnley Road, London NW10 1FD (Dollis Hill 2 mins walk, ample car parking space)

West London: 305 Edgware Road, London W 2, Tel: 01-723 0233 (Near Edgware Road +)

**EPSON FX** PRINTER ONLY £325 including BBC printer lead Twelve Months full warranty.

Valid on orders placed before 31st March.

#### TECHNOMATIC IS AN OFFICIAL BBC DEALER

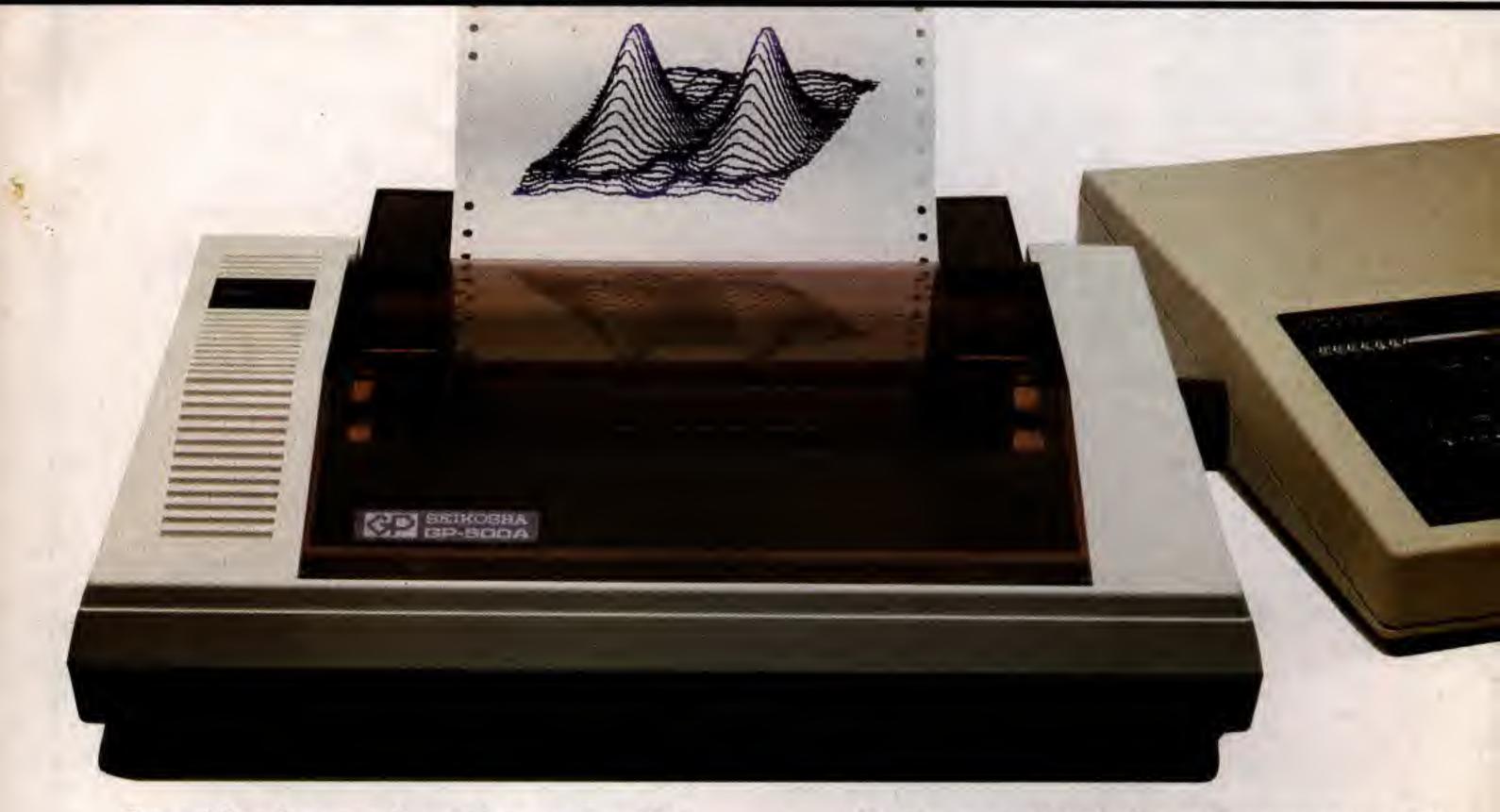
In addition to the items mentioned in our advertisements, we See Out double pas GOTES OF STATE OF THE STATE OF carry extensive stocks of: connectors, connector assemblies, components including TTLs, CMOS, RAMs, EPROMs and CPUs. Spares for the BBC computers are normally available from stock. Orders from government departments, public bodies, hospitals, schools, colleges, universities and recognised PLCs welcome.

### TECHNOMATIC LTD.

All prices exclude carriage & VAT. Please add carriage as indicated and add 15% VAI to the total order value. For fast delivery telephone your order quoting VISA or Access card or official order number. (Minimum telephone order £5).

## WHAT'S ON BBC?

# READ ALL ABOUT IT FOR ONLY £249.



Even with such a versatile workhorse as your BBC Micro, you've got problems.

For example, supposing you want a permanent record of important graphics? Or need to eliminate glitches from a lengthy program? Fast.

Without a printer you're stuck.

And up to now, even if you had a printer that could play in the same league as your BBC, you were stuck - with a price tag running into three or four hundred pounds.

The Seikosha GP500A changes all that.

It's got full graphics capability, with a single command enabling you to repeat a column of graphic data as many times as you like. Its printing speed is 50 characters a second in an 80 column dot-matrix format on standard width paper adjustable up to 10 inches.

And under its sleek casing, there's a wealth of sophisticated features. Like automatic printing (no data lost due to overflow), intermixing of all modes on a single line and printing of one copy as well as the original.

All for only £249.00.

No, you didn't misread. The Seikosha GP500A complete with BBC interface cable costs only £249.00.

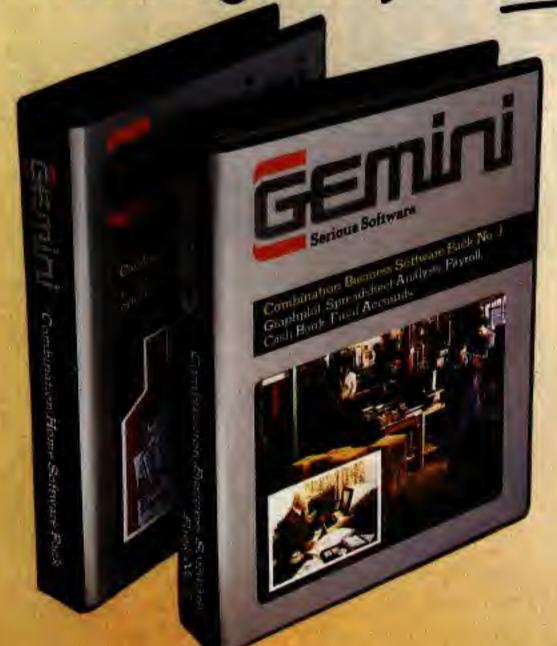
See the GP500A in action - phone for details and the address of your nearest dealer.

## SEIKOSHA DRG

DRG Business Systems, Peripherals Division, 13/14 Lynx Crescent, Winterstoke Road, Weston-super-Mare, Avon BS24 9DN.
Telephone: 0934 419914. Telex: 444761.

Businessor

Gemini gives you MORE!



Gemini Combination Packs... designed to offer maximum value and convenience to the serious business or home user by combining several programs in one pack.

Combination Business Pack No. 1	Normal list Price of programs in pack:	Combination Pack Price	SAVING
Contains: Graphplot, Spreadsheet Analys Payroll, Cash Book, Final Accounts	is,		E
C.0113 BBC 32K Cassette D.0113 BBC 32K 40 Track Disk E.0113 BBC 32K 80 Track Disk	207.75	159.95 159.95 159.95	40.00 47.80 52.80
Combination Business P	ack No. 2		
Contains: Database, Stock Control, Word Processor, Mailist, Invoices & Statements			
C 0114 BBC 32K Cassette D 0114 BBC 32K 40 Track Disk E 0114 BBC 32K 60 Track Disk	99.75	79.95 79.95 79.95	19.80 39.80 44.80
Combination Business Pa	ack No. 3	-	
Contains Database, Stock Control, Spread Analysis, Invoices & Statements, Mailist.	daheet		
C.1615 ELECTRON	99.78	79.95	19,80
Combination Home Pack	No. 1		
Contains: Database, Home Accounts, Mai Spreadsheet Analysis, Graph Plot.	list,		
C.0116 BBC 32K Cassette D.0116 BBC 32K 40 Track Disk E.0116 BBC 32K 80 Track Disk C.1616 ELECTRON	119.75	79.95 79.95 79.95 79.95	19.80 39.80 44.80 19.80
Combination Home Pack	No. 2	-	
Contains: Database, Home Accounts, Graph Plot, Mailist			
C 0417 EDECTIDITM ADV	79.80	20.05	19.85

easwe...

MORE Value!



Gemini Serious & Leisure Software... twelve serious titles for fourteen popular home micros, including PAYROLL, the ideal program for all wage calculations for up to 40 employees, with all PAYE and SSP tables held in memory... WORD PROCESSOR, with features including block delete, block insert, search and replace, edit text, display text, etc... HOME ACCOUNTS, for cost effective household management, plus ten really excellent games for all the family to enjoy. All on cassette or disk at prices ranging from £7.95 to £59.95 and available from larger branches of WH Smith, Boots and most good software dealers, or write to:





Gemini Marketing Limited

Electron Programs

MORE Available!

18a Littleham Road Exmouth Devon EX8 2QG England Telephone (0395) 265165/265832 Telex 42956 Attn Gemini

Micro Computer Software

#### The BBC-Sideways RAM System



#### The BBC Sideways RAM:

The most exciting add-on for the BBC micro, which many have been waiting for Acorn to produce!

#### What is the Sideways RAM?

The sideways RAM is a 16K (upgradable to 128K) memory board which fits into the rightmost ROM socket on your BBC micro. The sideways RAM is an essential piece of hardware for any BBC computer. Strategically integrated into the BBC system, the system CAN:

#### Answer definitively to shortage of Sideways ROM sockets:

The Sideways RAM is capable of running sideways system software such as languages, wordprocessor, electronic spreadsheet, etc.

#### Increase free memory for languages, add more entries to disk:

The sideways RAM can also be used to increase available memory by moving disk workspace into sideways RAM. PAGE is then set to the lowest possible value i.e. &0E00 thus rendering tape based software fully compatible with Acorn's disks. Furthermore, the disk directory is given extra space so that the maximum number of entries is increased from 31 to 154. Clearly, there is no way that other disk filing systems can offer such performance.

#### Increase text space for wordprocessor:

The Sideways RAM can also be used to increase effectively WORDWISE's text capacity from 24K to 32K or to a full 64K with the Silicon Disk. With the Sideways RAM system, you can create a whole chapter of a book in a single file! Machine code programmers using the Sideways RAM facilities are exceptionally favoured: the system can create assembly modules of up to 64K in size, up to 24K of space for labels and variables. A typical 8K machine code can be assembled in 2 minutes by BASIC, even directly to Sideways RAM.

#### Add a silicon disk to your computer:

If you have 128K of sideways RAM, part of it (112K) can be turned into a silicon disk. If you have a single drive, the system will address your floppy disk as drive 0 and the silicon disk as drive 1 (or 4 if you have 2 or more) but with a difference! The silicon drive has the capacity to load a 24K program faster than you can remove your finger from the 'RETURN' key with no clicking noise, no on/off LED, no wear. It can make you a backup floppy in 15 seconds from the original, proofread your wordprocessor texts nearly as fast as your own speed or recreate a relocatable, documented source code from an 8K ROM in minutes. The sheer speed of sideways RAM is absolutely ideal for programs like BEEBUG'S MASTERFILE (database applications), SPELLING CHECKER, VIEW (wordprocessing), Computer Concepts GRAPHIC EXTENSION (LOGO, Sprites etc.), BASIC, PASCAL, BCPL etc. Many other applications including games like ADVENTURE or CHESS will benefit from the ability of the Sideways RAM to make colourful 3D-graphic look like a movie picture or retireve any record in milliseconds. With the Solidisk fitted, the BBC outperforms most 16 bit machines.

#### Free software with every sideways RAM system:

The Sideways RAM comes already with lots of free software (on a 40 track single sided diskette). Sideways system software is free to all STL users, now and for future additions. All programs are given in basic source code and you are encouraged to personalise. Benevolent contributors will be rewarded with free hardware gifts. For example: 'STL0E00' and 'STL154' to set PAGE = &0E00 and allow 154 possible filenames, 'STLDISC' to create and maintain the SILICON DISK with extra commands like \*FORMAT, \*VERIFY and \*DCOPY, 'WORD32' and 'WORD64' to increase text size for WORDWISE to 32K or 64K characters, STLASM to produce very large (up to 100K) assembly programs and a few other demonstration programs. Soon to be released: STLBASIC to run basic programs right in the Silicon Disk.

#### Increase the computer power by increasing sideways RAM:

The power of the BBC relies on its intelligent use of software where several sideways ROMs execute different tasks such as filing, calculating, drawing, processing, playing music, talking, compiling, debugging etc. The bigger the sideways RAM, the bigger the task the computer can handle.

#### Beautifully designed, easily installed, no soldering required:

The sideways RAM was first introduced and the first issue sold out at the ACORN USER SHOW (Sept. 83, London). The new issue has been exhibited at the PCW SHOW (Oct/Nov. 83, London), was on general distribution release at the BBC USER SHOW (Dec. 83, Westminster, London), reviewed by all major BBC micro magazines and user clubs and since then every week, hundreds of BBC users discover the convenience of the Sideways RAM system.

#### You can install it in 2 minutes and do not need to solder.

You can buy the 128K Solidisk now or a 16 or 32K Sideways RAM and upgrade it later if you needs grow.

Further upgrading is very simple: from 16K to 32K is by straight exchange (cost: £15 + p&p), from 32K to 128K is by plugging in the SOLIDISK extension (see figure 3) onto the 32K sideways RAM. It costs just £85 plus p&p.

You can also take advantage of the cheap hardware add-ons such as EPROM PROGRAMMER (£15) and EPROM ERASER (19.95) designed specially to compliment the sideways system.

#### Soon Available: Solidisk's Floppy Disc Systems:

STL also produce DISK PACKS which comprise all the necessary IC's, DFS ROM, manual, connecting cables, demonstration diskette in different storage capacities ranging from the basic 100K disc system to 1.8MB dual drive system. Both single density and double density are supported, fully compatible with ACORN disk system and the sideways RAM system. The choice of single or dual density is yours and there is virtually no difference in price.

SINGLE DENSITY DISK SYSTEM: based on the Intel 8271, the single density disk interface consists of a set of IC's to be added directly to the BBC board and is comparable to Acorn's disk interface upgrade. You choose 1 or 2 drives (up to 4 drives are supported), they are all half height units and usually come from TANDON, SHUTGUART, TEAC or CANNON with capacity ranging from 100K to 400K per drive (switchable). The single density disc system uses normal FM/IBM compatible recording technique, soft sectored 5½ diskettes commonly available. Discs formatted with this system has 10 sectors of 256 bytes per track (2.5K bytes), a 40 track drive will offer 100K of storage using this system, a 80 track drive will offer 200K bytes and a double sided 80 track drive 400K, only 2 of the later can be used on the BBC. The real advantage of the single density disc system is neatness: the disc chip set goes neatly on the BBC board.

DUAL DENSITY DISK SYSTEM: based on the NEC 765A, the dual density disk system offers both single density and double density using MFM recording technique. The disc interface comprises a set of IC's and a small module plugging into socket 78. The advantage of the dual density disc system is the nearly twofold increased storage capacity with the same disc drive. For price information, please refer to ordering coupon below.

#### Detachable Keyboard Case and Integral Computer/Disk Case:

To compliment the Single and Dual Density Disk systems, we have commissioned a large plastic moulding firm to produce a beautiful injection moulded housing for the keyboard alone and a sturdy replacement case top for the BBC computer capable of accommodating 2 disk drives and supporting a colour monitor.

#### Epson Printers and Sanyo Colour Monitors, Magnetic Media:

We stock the whole range of EPSON PRINTERS, SANYO COLOUR MONITORS, VERBATIM, etc. floppy discs at very competitive prices.

#### THE BBC SIDEWAYS RAM SYSTEM SOLIDISK TECHNOLOGY LIMITED

HEAD OFFICE: 17 SWEYNE AVENUE SOUTHEND ON SEA, SS2 6JQ TEL: (0702) 354 674/5

Item	200.05
BBC 16K Sideways RAM (SWR16)	£39.65
BBC 32K Sideways RAM (SWR32)	£54.95
BBC 128K Sideways RAM (Solidisk)	£139.95
2764/27128 EPROM Programmer for STL Users	€15.00
2764 Blank EPROMs, pack of 5	£30.00
27128 Blank EPROMs, pack of 5	£60.00
UVIPAC, 15 minute EPROM Eraser	£19.99
Please add £1 post and packing.	0.000

#### Single Density Disk System incl. Drive, Interface,

DFS ROM, Leads and Manual:	
100K Disk Pack	£219.00
200K (Single Drive) Disk Pack	£269.00
2 x 200K D/S Single Drive Disk Pack	£319.00
2 x 200K (Dual Drive) Disk Pack	£490.00
2 v 400K (Dual Drive) Disk Park	2590.00

#### Dual Density Option: Please tick

Detachable Keyboard Case and 24" Cable CPU Case	£19.99 £10.00
Sanyo 14" Colour Monitors: Normal	£199.00
Medium (Ideal for BBC) Very High Res. for Cad Works	£299.00 £399.00
Please add £5 carriage costs	

EPSON PRINTERS FROM £199.00, RING FOR DETAILS.

\*Please delete/complete as applicable \*I enclose a cheque/ P.O. payable to: SOLIDISK TECHNOLOGY LTD for: £

	HE L	1 1	11			
NAME L		11	11	1 1	11	$1 \cdot 1 \cdot 1$
DDRESS			11		1 1	
111	11		1 1	11	1-1-	$1 \perp 1$
			1.1			
		1 1		11	++	H

## Home & Business Computers

THE NORTH'S LEADING COMPUTER SUPPLIERS



#### HARDWARE

BBC A	£299.00	inc free
BBC B	CONTRACTOR OF THE PROPERTY OF	
ELECTRON	£199.00	lead.
BBC A with 32k ar	nd VIA	£345.00
(runs all 'B' softw	are)	

BBC Cassette Player ......£29.95

#### PRINTERS

Seikosha GP 100A	£199 inc cable
Shinwa CP 80	£275 inc cable
Epson RX 80 F/T	£309 inc cable
9½" × 11" Fanfold paper	



#### DISC DRIVES

100K 40 track S/S	£179.95
200K 40 track D/S	
200K 40 track Dual S/S	
400K 40/80 track D/S	
(inc cables, manual and formatter,	1
Acorn Disc Interface £79.0	00 (fitted)
LVL Double Density D/1	
(100k = 180K)£90.0	00 (fitted)



#### DISCS (per 10 pack)

40 track SS/SD	£19.95
40 track SS/DD	£22.50
40 track DS/DD	£25.00
80 track SS/SD	£27.50
80 track DS/DD	

#### DEAL 1

BBC Model B
LVL Double Density Disc
Interface (100K = 180K)
100K 40 track Disc Drive £639.95
Cables, Format Disc, Manual (p&p £5.00)

#### DEAL 2

BBC Model B
LVL D/D Disc Interface
100K 40 track Disc Drive
Shinwa CP80 Printer
Word Processing Package
Cables, Format Disc, Manaual

£884.95

(p&p £10.00)

#### KNOW YOUR BBC

VHS or Beta video cassettes by Master Class providing an excellent way of learning about your BBC computer.

Tape 1 - Starting to Learn Basic

£19.95

Tape 2 - Further Basic

Tape 3 - Introduction to the Electron
Tape 4 - BBC and the Primary Teacher

each.

Hire available – returnable deposit £15 – £3 per week. 50p p&p. (Tapes for Spectrum available)

#### ACCESSORIES

Concept Keyboard A4	£/9.00
Concept Keyboard A3 £	113.00
Concept Keyboard Interface	£18.00
Edinburgh Turtle (BBC)£	
Economatics BBC Buggy £	189.00
Microrobotics "Beasty"	
Standard Servo for "Beasty"	£14.50
Grafpad Graphics Tablet (Disc or Tape) £	143.00
Hobbit Floppy Tape System £	155.25
Quickshot Joystick	

Full range of software by:

Acornsoft, Doctor Soft, BBC Soft, Superior Software Program Power, Bug Byte + many more!

### EDUCATION AND BUSINESS USERS

#### We offer:

- Wide range of Business and Educational Software.
- Educational and bulk order discounts.
- Warranty and post warranty maintenance.
- On site maintenance if required.
- Collection and delivery of repairs if required.

Contact Frank Ratcliffe on 061-633 1608

All prices include VAT

Mail order to Oldham address £5.00 per machine UK mainland

Send for FREE brochure



Access



Barclaycard

54 Yorkshire Street Oldham Tel: 061-633 1608 73 Yorkshire Street Rochdale Tel: (Rochdale) 344654 59 Daisy Hill Dewsbury Tel: 0924 455300



# Small business can now stop going by the book.

For under £1,000 a small business can now equipitself with a BBC Microcomputer, a disc drive, a word processor and printer.

(All tax deductible by the way.)

Once you've parted with that money, you'll find that business has never been brisker.

Because now, there's a new series of floppy disc software specially for the smaller business.

It has been developed by Acornsoft, the software division of Acorn Computers who are the manufacturers of the BBC Micro.

For only £24.95, each disc can store volumes of vital bookwork which can be updated and amended in a fraction of the conventional time.

And there is a disc to cover most aspects of paperwork and book-keeping.

The Invoicing package.

This program stores details of products, VAT numbers and, of course, the names and addresses

of your customers. As orders come in, you simply record them. Then, when it's time to invoice, you just press a few keys and each invoice or credit note is printed automatically in seconds.



Allowing for variable terms of trading, the system calculates and prints discounts. And it should help to improve your cash flow dramatically.

The Order Processing package.

With this program, you can confirm your customers' orders, prepare and print despatch notes and make fast analyses of

of all the orders stored on disc.

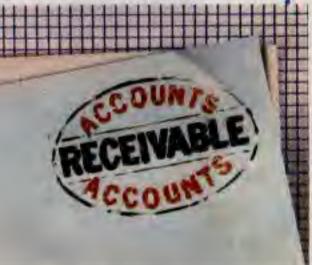


The Accounts Receivable package.

Now, it couldn't be easier to keep your customer accounts under control.

In an instant, you can analyse

debtors, produce statements, keep a check on any credit limit and calculate VAT output automatically. Using this package



in conjunction with the invoicing package, you can also keep tabs on payments received against payments outstanding.

The Accounts Payable package.

This package will keep you fully up-to-date on how much you owe and who to. In addition, it calculates



input VAT and, used with the Accounts Receivable package, produces instant VAT returns.

It also highlights settlement discounts, produces remittance advices and provides an immediate analysis of all creditors.

#### The Stock Control package.

Touch a few keys and you have instant access

to stock status and automatic analysis by quantity and value.

Consequently, it's easy for you to maintain correct stocking levels, having an early warning of out-of-



stock situations or the likelihood of over-stocking.

Average value of the business they do with you, or whether they are good or bad payers.

Then, when you are doing a mailing, you simply choose the group or groups of customers you want.

## At £24.95 each, these packages could be priceless.

Each package comes with clear instructions on how to get the program running so that you can devote much more of your time to more profitable activities.

If you're a credit card holder, you can order any or all of the packages by ringing: 01-200 0200 anytime. Or 0933 79300 during office hours.

(By ringing the same number, you can get the address of your nearest stockist, or full details of the BBC Microcomputer system if you don't already have one.)

Alternatively, you can order the packages by sending the order form below to: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Please allow 28 days for delivery.

Credit card holders, phone 01-200 0200, anytime. Or 0933 79300, during office hours.



#### The Purchasing package.

All your suppliers' names and addresses go onto the disc. Then they can be retrieved instantly

for preparing and printing orders.

All order data can be recalled in seconds, allowing you to check on orders, and suppliers' invoices and to record all deliveries.



#### The Mailing package.

Instead of the shotgun method of sending mailshots, this package enables you to refine each mailing down to the customers who are most likely

to respond.

It gives you a rapidly accessible mailing file of your customers, according to any criterion you choose. Size of company, for instance, or type of business.



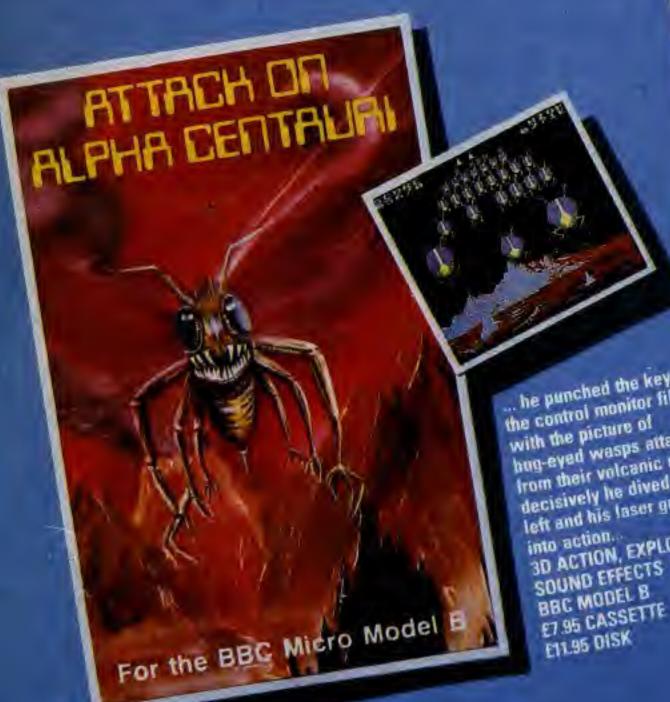
Please send me the packages at £24.95	each.		(Code Acornsof
PROGRAM	QUANTITY	TOTAL	use only.)
Invoicing			SNB 08
Order Processing			SNB 12
Accounts Receivable			SNB 10
Accounts Payable			SNB 13
Stock Control			SNB 11
Purchasing		100	SNB 14
Mailing			SNB 09
	TOTAL		

Acornsoft Ltd. Or charge my
BC Microcomputer System
Postcode
VAT No. 215 8123 85

## ACORNSOFT

## The invasion has begun... for BBC Model B

Let excitement invate your home computer! Travel to Alpha Centauri. Enter the Vortex. Command the ground missiles, or join the shoot-out at the O.K. Corrall



. he punched the key, and the control monitor filled with the picture of bug-eyed wasps attacking from their volcanic nest; decisively he dived to the left and his laser gun burst 3D ACTION, EXPLOSIVE SOUND EFFECTS BBC MODEL B



there was no escape, he had to enter the Vortex and bet on his skills! He grabbed the manual controls and with determination fired both upper deck gans. KEYBOARD OR JOYSTICK. **EXCELLENT SOUND** BBC MODEL B **F7.95 CASSETTE** £11.95 DISK



the continued thunder of the hissing ground missiles had long now dealened him - unless he had some of those bombers down, the fleet, in the small stretch of water was a sitting 3D ACTION, SOUND EFFECTS, BEAUTIFUL

GRAPHICS

iere-Model B

Distributors, Multiple Store and

Retailer Group inquiries invited.

BBC MODEL B

E11.95 DISK

ET 95 CASSETTE

 Available from WH Smith, HMV, all Spectrum shops and over 500 retail outlets in the U.K.

For the BBC Model B

the movement of the saloon-bar door was all the warning he needed! At the speed of light his hand moved toward his holster, while a sixth sense warned him of the upper floor window... 3D ACTION, SOUND EFFECTS, BEAUTIFUL GRAPHICS BBC MODEL B **£7.95 CASSETTE** £11.95 DISK

> Do you write your own programmes? If you have an unusual programme which can meet our standards you could be earning more than £250 p week. Why not take advantage of our sought after reputation. Write no

#### **HOW TO ORDER**

INVASION

50 Elborough St.

London SW18 5DN

Tel:(01)870 1197

Southfields.

You may purchase any of the Games listed from most good BBC Software Stockists, WH Smiths, HMV or your nearest Spectrum Dealer.

To order direct, fill in the coupon below with your requirements, make cheque/P.O. payable to: SOFTWARE INVASION and post to us. Please allow 7 to 14 days for delivery.

(Title) (Qnty.) £

☐(TAPE) ☐ 40 TRACK

☐ (DISK) ☐ 80 TRACK (Please tick)

(Qnty.) £ (Title)

☐(TAPE) ☐ 40 TRACK

☐ (DISK) ☐ 80 TRACK (Please tick)

(Qnty.) (Title)

☐(TAPE) ☐ 40 TRACK

☐ (DISK) ☐ 80 TRACK (Please tick)

(Title) (Qnty.) ☐(TAPE) ☐ 40 TRACK

☐ (DISK) ☐ 80 TRACK (Please tick)

Total £

Post to: SOFTWARE INVASION 50 ELBOROUGH STREET SOUTHFIELDS LONDON SW18 5DI

I enclose my cheque/P.O. for £

NAME

ADDRESS .....

TEL: (Day) TEL: (Eve)

□ I am a Distributor/Multiple/Retailer/Deale Please contact me.

(Please delete whichever not applicable)



THE INTERNATIONAL VIDEO GAME OF THE YEAR COMPETITION HERALDS THE "NEW AGE" IN VIDEO/COMPUTER GAMES

\$175,000 TO BE WON



Create a brilliant, new video game becoming a millionaire. This fantastic competition, organised by I.R.P. (The International Register of Independent Computer Programmers Ltd) and the famous Mark McCormack International Management Group, offers programmers and inventors the opportunity of a life time. There are huge, immediate cash prizes and the on-going revenue of 10% of the sales of all games to distributors throughout the world, plus the chance to appear on an international TV show. Your skill and imagination could bring you fame and fortune!

## \$100,000 FIRST PRIZE! FIVE \$15,000 RUNNER-UP PRIZES!

Devise a totally original new video game in one of these categories: SPORTS, SIMULATORS, ARCADE, STRATEGY, ADVENTURE/FANTASY or a special section which covers programmes that are not necessarily games but have outstanding Educational or Entertainment merit. We'll also be announcing a number of 'MERIT' awards which will be

entitled to carry the message 'An International Video Game of the Year MERIT AWARD' on their retail packaging. It's a great challenge. And the rewards, both financially and in terms of prestige, are tremendous. This is the most exciting competition ever for creative computer and video enthusiasts.

### YOU'RE A TV STAR

All six winning games and their inventors will be featured on an internationally distributed, spectacular TV special. That's going to make your name!

## HOW TO ENTER

Just send in your game, or games, programmed on cassette for any popular home computer. Use the coupon, today, and we'll send you all the facts you need.

#### CLOSING DATE FOR ENTRIES IS 31st MAY 1984

To: IRP Limited, Pinewood Film Studios, Iver, Bucks, England.

Name
Address
,

MU1

## Electronequip

in

### Hampshire

Authorised BBC Dealer & Service Centre

#### SPECIAL OFFERS

PHONE FOR DETAILS

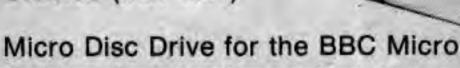


Electronequip is an authorised Acorn service centre and has been an Acorn dealer since the introduction of the Atom. Our demonstration facilities include 20 station Econet and Torchnet systems.

Ref.	BBC Micros	Ex VAT	Inc VAT
ANB01	BBC Model B Micro Computer	348.26	399.00
ANB02	BBC Model B with Econet Interface	389.14	446.00
ANB03	BBC Model B with Disc Interface	409.14	469.00
ANB04	BBC Model B with Disc & Econet Interface	450.01	516.00

3" Micro Disc £129.95 (inc. VAT)

Disc Interface & Drive £198.95 (inc. VAT)



The Micro disc drive offers a method of low cost quick access to programs. The drive is essentially a small version of a 5½" disc drive and offers similar features to the larger drive.

The data is stored on a 3" disc, this is enclosed in a protective hard plastic cassette which features a write protect switch.

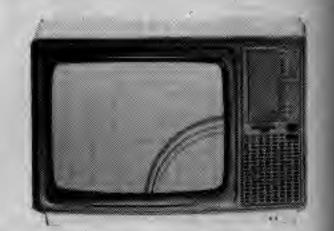
The micro drive requires the standard Acorn disc interface, but a new disc filing system rom. Acorn DFS may be exchanged for the micro DFS for £12.00. The new micro disc filing system allows 60 files per disc surface and it can read and write to Acorn DFS discs. Thus if a 5½ inch and a micro floppy were connected on the same cable files could be transfered between them.

Capacity: 80.64 K bytes Transfer Rate: 125kbit/s

TRADE ENQUIRIES WELCOME
Access & Barclaycard Accepted
Large Stocks – 24 Hour Despatch
Carriage 50p to £3.50



#### NORDMENDE



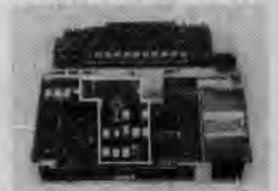
#### 14" TV/Monitor £217.00 + VAT

Ref.	Monitors	Ex VAT	Inc VAT
MNB1401	BMC 1401 Colour Monitor	225.00	258,75
MNCE370A	Cable CE 370A Colour RGB Monitor	199.00	228.85
MNKVIS2	Kaga 12" RGB Monitor Vision II (Medium)	285.00	327.75
MNKVIS3	Kaga 12" RGB Monitor Vision III (Hi)	399.00	458.85
MNM1431	Microvitec 1431 14" Colour Monitor (BBC)	215.00	247.25
MNM1441	Microvitec 1441 High Res 14" BBC Monitor	440.00	506.00
MNM1451	Microvitec 1451 Medium Res 14" BBC Monitor	325.00	373.75
MNN1534	Nordmende 14" TV/Monitor	217.00	249.55
MNN3534	Nordmende 14" TV/Monitor with remote control	234.00	269.10
MNN4430	Nordmende 20" Prestige TV/Monitor remote	417.00	479.55
MNN4432	Nordmende 22" Prestige TV/Monitor remote	458.00	526.70
MNN4437	Nordmende 27" Prestige TV/Monitor remote	512.00	588.80

#### SIDEWISE

#### SIDEWISE FITTED





"SIDEWAYS" rom board for BBC Micro. No soldering required £38.00 + VAT

## **EPSON**

RX-80 £263.12 + VAT

FX-80 £365.09 + VAT

Printer price includes cable for BBC and screen dump rom is available for £7.50

## TORCH COMPUTERS Perfectly Made in Britain

Ref.	Torch Computers	Ex VAT	Inc VAT
TDZ8DP	Torch Z80 Disc Pack (Dual 800K + Z80)	730.00	839.50
TC301	Torch Work Station (No monitor) (301)	1244.00	1430.60
TC303	Torch Work Station with TOSCA (No monitor)	1449.00	1666.35
TC401	Torch Computer twin 400K (new style)	2250.00	2587.50
TC403	Torch Computer twin 400K & TOSCA (grey)	2455.00	2823.25
TC68000	Torch Computer twin 400K Floppy & 68000	3550.00	4082.50
TC68020	Torch Computer 20Mb Hard Disc & 68000	5900.00	6785.00
TCF500	Torch Computer twin floppies (CF500)	2950.00	3392.50
TCFS500	Torch Computer twin 400K & TOSCA (CH500)	3150.00	3622.50
TCH520	Torch Computer 20Mb Winchester CH520	5650.00	6497.50
TCHS520	Torch Computer 20Mb Hard Disc & TOSCA	5850.00	6727.50
TMC240	Torch Colour Monitor (MC240)	575.00	661.25



Electronequip

Kings Lynn Branch Tel: 0553 3782

BBC

## Electronequip

in

### Hampshire

Authorised BBC Dealer & Service Centre

## DISC DRIVE + INTERFACE £173.00 + VAT



## DISC DRIVE £113.00 (+VAT)

#### MCD 1 MICRODRIVE from ELECTRONEQUIP

We are pleased to announce that the MCD 1 Micro drive is now a reality, and available Ex-stock from Electronequip.

The Drive is single sided and stores 80K Bytes formatted (100K unformatted). It comes complete in a case, with cables and formatting disc. It incorporates all the Acorn DFS calls and with the ability to address 5.25" and 3" drives (\*MICRO and \*MINI).

An operating manual will be available, giving a breakdown of all the commands and their use.

The cost of the drive is £129.95 including VAT and the interface can either be bought as a package for £198.95 (for both drive and Interface). Alternatively we will exchange your Acorn DFS for a Micro-DOS EPROM for £13.80 or sell you the Micro-DOS EPROM for £25.00. Diskettes are £4.30 +VAT each.

Reference	Description	Exc VAT	Inc VAT
DDEMDO1S	Elect 80K Single Micro Disc Drive	113.00	129.95
DS3M45S	3" MCD 45T Single-sided Disc	4.30	4.95
UGMDISC	Micro Disc Upgrade (I/F and Single Drive)	173.00	198.95
UGMIDOS	Micro DOS/Acorn DFS exchange ROM	12.00	13.80
SPMDISCR	Micro Dos ROM (DFS for Micro Disc)	21.74	25.00

See our price list for full details.



Electronequip

36-38 West Street, Fareham, Hants (0329) 230670



## SOFTWARE FOR THE BBC MICRO

## DISC DOCTOR ( 09 DIS ((sta)) ((end)) ((ofs)) DISCTAPE (atsp) ((atsp)) DOWNLOAD ((sp) ((adr)) DSEARCH (str) ((trk)(sct)(drv)) EDIT (fley no )) FIND (str) FORM (drv) (no (rks) ((st()) ((S)) JOIN ((so) (atsp) ((atsp)) MENU ((drv)) MOVE ((dext page)) ((src page)) MSEARCH (str) ((adr)) MZAP ((adr)) PARTLOAD ((sp) (ofs) (ext) (adr) RECOVER (trk) (sct) (sct) (adr) (drv) RESTORE (trk) (sct) (sct) (adr) (drv) SHIFT (src) (dest) (ext) SWAP ((drv)) TAPEDISC ((vsp)) VERIFY ((drv)) ((no trks)) ((stt))

#### **DISC DOCTOR**

Following on from WORDWISE this utility ROM is the ideal way to get the most out of your computer system. This ROM adds 20 new commands to the Machine Operating System. Most of these are concerned with DISC operation although some of the commands are totally general purpose. Disc Doctor allows up to 60 files per side of a disc and includes its own disc formatting and verifying commands. Three search commands will find any string in memory or on disc, or will list all the line numbers in a BASIC program that contain the string. Many other features include disassemblers, disc/memory editors, function key listing etc. Works with all versions of the Acorn DFS, and other Acorn compatible DFS's. £28 plus £1 p&p plus VAT.

Because the above programs are in ROM they are always available, and usually take no user memory when operating. All the commands can be used from within BASIC programs and the ROMs includes a help menu listing the syntax of all commands.

WORDWISE

(C) Computer Concepts 1982

1) Save entire text
2) Load new text
3) Save marked text
4) Load text to cursor
5) Search and Replace
6) Print text
7) Preview text
8) Spool text
ESC Edit Mode

Plomes unter choice

#### WORDWISE

This ROM based word processor is simple to fit and simple to operate. Its greatest strength lies in its ease of use, yet it is a fully fledged text processing system, with all the features you would expect to find in many more expensive programs.

Once entered the user has total control over the text. Any section may be marked, this may be a word, sentence or any larger piece of text. The marked section may then be instantly deleted, moved or copied to any other point in the document. The more complex operations are menu driven so that the user is always prompted when necessary. When printing a document the user may specify the line length, line spacing, page length etc. WORDWISE even handles automatic page numbering, centering of text, justification and many more powerful features.

This word processor has become the best selling program for the BBC machine. In the year since its launch it has outsold all other available ROM, cassette or disc based word processors and continues to outsell them. £39 plus £1 p&p plus VAT.

## Printmaster

Joining our already extensive range comes PRINTMASTER a sophisticated printer handling utility ROM. PRINTMASTER will be released in several versions catering for each of the most popular printers on the market. This first PRINTMASTER ROM supports a range of EPSON printers: MX80, RX80, FX80 etc. All commands in the ROM must be preceded by an asterisk and can be used like all normal operating system commands from within BASIC programs etc. It is also possible to use them from WORDWISE and other language ROMs.

PRINTMASTER supports three types of screen dumps. The most flexible (\*GDUMP) allows any graphics on the screen to be dumped onto the printer. This will operate in any mode, the colours being displayed as shades. Any part of the screen may be printed at any position on the paper in any one of four orientations. It is also possible to magnify the screen dump by any factor x2, x3, x4 etc.

A special feature allows true Mode 7 screen dumps with TELETEXT text and graphics, colours (as shades), double height etc.

- ★TDUMP allows any text mode to be dumped and ★FDUMP will automatically print the contents of a file on disc to the printer WHILE the BBC machine is doing other things, running other programs etc.
- ★WINDOW allows the user to interactively define a graphics window, this controls the part of the screen printed in ★GDUMP. A very much easier method of defining graphics windows than the normal VDU statement.

The above list is only a fraction of the commands in the PRINTMASTER ROM. Others include \*CENTRE, \*UNDERLINE, \*ITALIC, \*MARGIN etc. etc. which provide total control over the printer in the easiest possible manner. Order as PRINTMASTER (Epson), £28 plus £1 p&p plus VAT.

licro since its inception and write for no other

Computer Concepts specialise in writing quality software for the BBC machine. We have been involved with the BBC Micro since its inception and write for no other machine. We are not dealers, nor are we involved in selling anything other than software.

All the above products and further details are available either directly from us or from all good BBC dealers.





16 Wayside, Chipperfield, Hertfordshire. WD4 9JJ Telephone: Kings Langley (09277) 69727





## MICROACE-LONDON'S PREMIER

A complete range of games,

application and business

software.

#### More an experience than a computer shop.



 A library of books that give specific or general information.

#### The Acorn Expert

If you are thinking of buying a BBC Micro or the amazing new Electron, then come to Microage and benefit from our experience. We have been a dealer practically since Acorn started. In fact we have been selected by Acorn to be the official London Distributor. This means we get the latest products in quantity first.

#### The Amazing Acorn Electron – In Stock Now!

We have stocks of Acorns new Electron and all Acornsoft software. Come and buy one now. £199.

## £ of the Month £

BBC micro with Disk Interface, 800K disk drive, word processing ROM, Epson or Juki printer, Zenith Monitor, dust covers Basic Programming book, leads, paper and cables. Free carriage. Normal price £1,843. Save £244. Our price £1,599.

#### A Selection from Acornsoft

Snooker, Starship
Command, Missile Base,
Draughts and Reversi,
Acardians all
Personal Money
Management, Arcade
Action
View
BCPL

#### A Selection from Computer Concepts

Wordwise, Beebcalc
Disk Doctor
Termi price on
application
Chess, Android Attack,
Swarm all

#### Some of our books

Easy Programming for BBC
Basic Programming on
the BBC micro
Assembly Language
Programming for BBC
Discovering BBC
Discovering BBC
Machine Code
Creative Graphics,
Graphs and Charts, LISP
and FORTH all at
30 hour BASIC
BBC Micro Expert Guide

BBC Machines

Model A, 32K RAM and
6522 £329

Model B £399

Model B + Disk interface £494

BBC dust cover £3.95

Friendly assistant to offer

help and advice when you

request it.

#### **Disk Drives**

£9.95

£11.90

£59.95

£99.95

£39.95

£33.00

£8.95

£5.95

£5.95

£8.95

£6.95

£7.50

£5.95

£5.95

BBC compatible single disk drive (100K) £235
BBC compatible dual disk drive (200K) £389
BBC compatible single slimline (400K) £399
Verbatim single sided diskettes 10 for £22.50
Verbatim double sided diskettes 10 for £39.95

#### Monitors

Colour Monitor inc. lead.

(As used in BBC
Computer prog.) Price
dramatically reduced to
Microvitec medium res.
colour monitor. Price cut
to
12" Zenith High res.
green screen monitor.
The new model at
BNC Cable
£4.95

## HOME COMPUTER DEALER

If you are interested in joining the home computer revolution or adding to your present system, then come along to Microage. In a relaxed atmosphere you can browse through the best selection of computer products and peripherals in London. Helpful assistants who really know about the products offer unbiased advice to help you choose a personal computer or get the best out of your own.



 The Microage Space Station, you're always in command. Sit at the controls and you'll see everything laid out neatly before you.

There's room for your printer, monitor, keyboard, cassette recorder and disk drives – and a handy draw for programs and manuals.

The Microage Space Station takes off for just £49.95





Business computers too!

 A complete range of personal computers.

#### **Computer Users Data File**

If you can't make it to the shop you don't have to miss out on our prices and services. Just write for our Computer Users Data File. 24 fact-packed pages of current stock and prices.

## Institutional and Educational

Microage offer very competitive rates and quotations for quantity orders on all equipment including Econet networks. We have four years experience of supplying and servicing Acorn equipment in schools, polytechnics and universities.

#### **Printers**

Seikosha AP – 80A now Seikosha AP – 100A now Epson FX – 80 Epson MX – 100 Juki 6100 Daisywheel All printers include paper and cable. Printer Cable 10" listing paper, 2000 sheets

#### Miscellany

RH Electronics colour light pen BBC Compatible Cassette Player DIN to Jack Lead APTL ROM Board Official joystick per pair 10 Blank C12 tapes £189 £215 £430 £460 £430

£13

£16.50

£39.95

£29.95

£43.70

£2

£13

£3.95

Microage Discount Card

This card entitles the holder to the following discount

Why not ask for our discount card guaranteeing you 5% discount off everything after your first purchase.

All items subject to availability.

#### **POSTAGE RATES**

Small items such as Ribbon, books and software:— 1 item £1.00, 2 items or more 50p per unit.

## BY COURIER TO YOUR DOOR

Large items such as Computer Disk Drives and Monitors:— 1 item £7, 2 items £10, 3 or more £13.

Barclaycard and Access welcomed.
All prices include VAT.

#### MICROAGEELECTRONICS

135 HALE LANE EDGWARE MIDDLESEX HAS 9QP TEL: 01: 959 7119 TELEX 881 3241 dames for Micro



available on 800 net

#### **Games for the Adventurous**

#### Secret Sam I

You are Secret Sam. A top secret agent engaged upon a highly dangerous and confidential mission. In this intriguing adventure world of spies, counter-spies, double-dealers and espionage you must act swiftly but cautiously whilst searching for clues. Can you trust the agents that you meet? Have you all that's necessary to successfully accomplish your deadly assignment?

#### Secret Sam II

Following the success of his last mission – Sam is off once more on his journey into intrigue – tread carefully though for if you thought SAM I was dangerous your in for a shock! This really is an adventure game for the adventurous – be careful and mind how you go. Are the 'phone kiosks for changing into Superman? We're not saying but what we will say is "have the aspirins ready because this will certainly cause some headaches".

#### Q-MAN



The very popular 3D pyramid game. Hop around the pyramid avoiding the bouncing balls and Jake the Snake. A highly entertaining game with increasing difficulty plus our own totally unique features. Game includes TRANSPORT DISCS, BONUS, HIGH-SCORE TABLE, HYPERSPACE and SMART BOMBS. Excellent graphics and terrific sound. One of the three top selling games on MICRONET this month.

No 1 on Micronet

#### **Q-MAN'S BROTHER**



Q-MAN'S BROTHER is featured in the high score table of Q-MAN and now has his very own game. Have you time to paint all of the maze? Not if the PAINT POTS have anything to do with it or especially the deadly PAINT ROLLER which will erase all of your hard work! Increasing difficulty, excellent sound, AMAZING 3D graphics and high score.

No 5 on Micronet

#### BANANA MAN



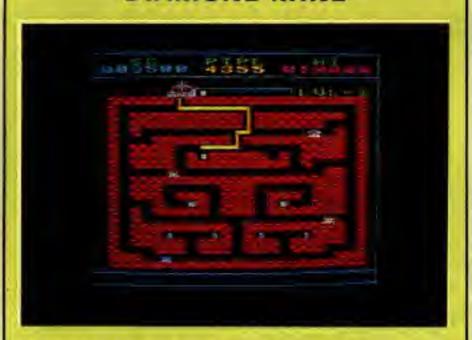
A totally new concept from MRM. You are the BANANA MAN and you must eat 40 BANANA SANDWICHES each minute to stay alive. There are BLUE BLOCKS which may prevent you from reaching the food and deadly PURPLE TARANTULAS that are fatal if stepped upon. ETHEL the CAT also appears but can be scared away for mystery points. But watch out, she conceals a spider. Features include BONUS BANANAS, BLOCK 'SHUFFLE', INCREASING DIFFICULTY, HIGH-SCORE TABLE and GREAT GRAPHICS.

#### **GUY IN THE HAT**



You are THE GUY IN THE HAT entombed in a honeycomb labyrinth. Like BANANA MAN you have an increasing daily food diet, but this time your favourite snack is a BICKIE. Beware of the pursuing BICKIE BASHERS that are trying to ensnare you. Gain extra points by dropping your exploding hat and trapping the BICKIE BASHERS. Movement in 6 directions, HYPERLEAP and menacing sounds are included along with the usual great graphics and high-score table.

#### DIAMOND MINE



An absolutely fascinating and compulsive game designed to test your skills of dexterity and coordination. Steer the lengthening pipe to the diamonds buried deep in the depth of the diamond mine. But be careful avoid hitting the walls with the pipe and watch out for those monstrous menacing meanies . . , the bugs. Have you enough pipe left to collect all the diamonds? Have you got steady hands? Find out with this sparkling gem from MRM.

#### 3D MUNCHY



A visually stunning version of the now legendary arcade classic with a difference. Eat power pellets whilst avoiding the GHOSTS as usual, but can you get past the HOLES? Absolutely amazing graphics and sounds, increasing difficulty and high score. All this and you're battling against the clock as well. A CLASSIC from MRM.

No 8 on Micronet

#### EACH GAME ONLY £5.70 ENCLOSE 55p P&P PER ORDER



#### **MRM SOFTWARE**

17 Cross Coates Road GRIMSBY South Humberside Telephone: 0472 44304 Dealers telephone now for dealer prices



'Dataplus have made their name supplying computer peripherals at competitive prices.

I believe that we have now found the best price/performance daisy wheel alternative to dot matrix. The ideal printer for both data and word processing. Truely, a high quality machine at an affordable price. As Managing Director, I guarantee you won't buy better.'

So whatever your computer — BBC, Spectrum,\*Commodore\*, Dragon, Oric, Apple and many others — make the most of it and turn your computer into a quality printing system for home correspondence, documents, short stories and business use.

Use standard stationery or, for ONLY £79 (if ordered with your TP1) we will supply a tractor feed so you can use continuous or fanfold paper.

This is just one offer you can't miss. To avoid disappointment RING NOW on our 24 hour answering service 0242 527412 to place your order quoting your Access/Barclaycard No., expiry date and full name and address OR complete the coupon below and POST TODAY.

Please allow 28 days delivery. If not completely satisfied return goods in original packing within 10 days of receipt and we will replace or refund your money in full.

For technical queries telephone our Expert Hotline 0242 37373 or visit our showroom at 39-49 Roman Road, Cheltenham.

\*CBM 64 & Spectrum Computers require a special interface cable kit. For assistance & price phone our Technical Hotline.

#### SPECIFICATIONS

Weight: 18.5 lbs

BMU1

Print Speed: 120 wpm
Character set 128 ASCII 88 printable
Character spacing: 12 CPI
Printing: Unidirectional
Paper width: 13" max.
Writing line: 10.5" 126 character line
Line spacing: 6 lines per inch
Paper Feed: Friction, single sheet or
fanfold.
240 volts, 50Hz

Dimensions: (H) 6.4" (W) 19.5" (D) 12.4"

Operator Controls: Power on/off, top of form, impression controls (5 levels)

. Frotherhood

#### INTERFACES

#### Parallel

Centronics compatible, 7 bit parallel data, 3 control lines (data, strobe, busy, acknowledge)

#### Serial

RS232C compatible, 50-19200 BPS, parity and character bit length all switch selectable.

Dataplus-PSI Ltd 39-49 Roman Road Cheltenham GL51 8QQ. Reg. No. 1715271 England. Offer open to UK only while stocks last.

To DATAPLUS-PSI Ltd 39-49 Roman Road Cheltenham GL51 8QQ

Qty	Description	Price	Total
	TP1(s) with RS232 interface	£250	
	TP1 with centronic interface	£250	
	Interface cables serial/parallel*	£15	
	Tractor Feed	£79	VIE
*Del	ete as applicable	Total	

and made payable to DATAPLUS-PSI Ltd or charge my Access/Barclaycard* Account No.	
Expiry date of card	
Signature	
NameAddress	
Postcode Telephone No:	
***************************************	

## ARE YOU SERIOUS?

STOP PRESS - Larger BOOTS

(now compatible with Acorn, Pace and Watford DFS)

In addition to the features below it also works with "locked" programs plus very long programs (HEX &EOO to 7BOO)

REPLICA II and THE KEY give you, the user, what you want. You have bought your disc drives and now want to take advantage of them, but most of your favourite software will not run with the disc interface and even if you are prepared to pay out for disc versions of everything you can't get them and if you have 80 track drives you might as well give up. If you know everything about the DFS, memory locations, saving procedures etc, you can probably save some of them onto disc. What's a half hour per program, and it only takes a few minutes to find, load and relocate it each time (if you can remember the sequence).

On the other hand you could buy REPLICA, enter a few details i.e. 1) program name, 2) number of sections, 3) CHAIN, \*RUN or \*LOAD 4) press play and then make a cup of tea whilst the program loads from cassette for the last time. When you return the program will be on the disc and shown in a menu under the name you gave it. There are now only two alternative storage methods required and one of them will work with most programs. There are some exceptions to REPLICA II but the number is insignificant. Many users have purchased 4 or 5 copies of REPLICA and it is now the recognised format that dealers use to display their software. REPLICA II will now hold up to 16 programs on each disc, they can be erased if required and a new batch saved, but why not just buy another REPLICA and keep your programs on disc

permanently (it only costs approx. £1.00 per program).

REPLICA II £12.00 (state 40 or 80 track)

ALL SOFTWARE
NOW ON 3" DISC
AVAILABLE

Ring to check
are NOT using
Amcom DFS.

Hotline 0606

#### THE KEY

THE KEY provides you with the facilities that should have been included in the Disc Filing System and also helps you reach the parts other discs can't reach. This new version of THE KEY has been made compatible with ECONET at the request of many schools, colleges and universities. The whole program has been turbocharged and the facilities are:

- 1) FORM40 now much faster.
- 2) FORM80 now much faster.
- 3) BACKUP has that effect on some people because it allows even most of the protected discs to be backed up faster too.
- 4) EDITOR display, read and alter sectors, even if you can't list the program. Highlight any byte whilst searching, make additional searches, edit bytes now allows entry in HEX or ASCII and in string format. Dump a sector to printer, file pointers etc etc. You can now see how data is stored on a disc and alter it if you wish. Of course, it's also faster.
  5) RETRIEVE don't despair when you have a corrupted disc or if a program is accidentally deleted, using RETRIEVE your worries are over.

With so much from one utility it is no wonder that THE KEY is outselling programs that cost the same but provide far less.

THE KEY £12.95 (state 40 or 80 track)

SHADOW

available at larger BOOTS

#### 10.00.00

A tape cloning program that will enable you to make security back ups of your valuable cassette based software.

SHADOW works with 99% of all known programs including those containing 300 BAUD sections. Handles programs of any length and works with any operating systems.

SHADOW is the definitive tape backup system. Also on the same tape is a very useful program called "INSPECTOR" which allows the user to page through memory, search for a string, etc.

BOTH PROGRAMS £8 incl.

(This program for personal use only).

#### GRAFKEY/GRAFDISK

The first and best CAD program for the BBC Micro. Used in education, business, art, video etc. Recommended by LASERBUG, BBC MICRO USER, PCW, SOFT and thousands of satisfied users (see earlier issues of BBC Micro User for screen pictures). In a comparative review of the major CAD programs PCW said: "Considering the options it is by far the best value". Need we say more, if you need a graphics utility then this is it.

GRAFKEY (joystick & keyboard) £9.00 GRAFDISK (state 40 or 80 track) £12.95

#### JOYSTICK UTILITY

Converts non-joystick programs to work with joysticks. Works with any program using INKEY(-), which applies to most programs. Easy to use, just press the keys you want to transfer. Supplied on cassette but can be transferred to disc.

available at larger BOOTS

CASSETTE £6.00

#### SINGLE KEY ENTRY Requires 1.2 O.S.

A very useful utility that provides single key input of 66 key words. Just like having 66 function keys. Compatible with issue 1 & 2 basic and discs.

CASSETTE £5 inclusive

#### **JOYSTICKS**

Pair of fully proportional joysticks of compact and handy size

£17.95



#### **EDUCATIONAL CORNER**

(for the 5-11 age group)

THE GARDEN – 3 programs with superb graphics. Covers: colours, spelling and understanding. Cassette £8.00

COUNTING - robots, rockets, flowers, etc. Excellent graphics, good range, Cassette £6.00

MATCHING - 4 programs covering numbers, words, shapes and patterns. Cassette £7.00

HUE-MEN — A superb teaching-aid, using animation techniques in Mode 7.

A hit with adults and children alike.

Cassette £6.00

And now SHAPE MEN using the same techniques. This is the second in an integrated approach to teaching. £6.00

INTRO - A simple programming language which uses the immediate visual response of "Turtle" graphics to introduce a number of programming concepts and techniques. Cassette (and 9 page manual) £10.00

#### **PROGRAMMERS**

We are constantly seeking new and interesting programs. Why not send yours for appraisal? You have got nothing to lose but much to gain – So why not send your program today? 40 track disc if possible or two copies on cassette. In some cases we will even provide disc drives against future royalties.

#### CLARES MICRO SUPPLIES



Dept. BMU3, 98 Middlewich Road, Northwich, Cheshire, CW9 7DS. Tel: 0606 48511 All prices inclusive of VAT + Carriage – No Extras.

## KEENEST PRICES \* PROMPT RELIABLE SERVICE \* THAT'S TWINSTATE

\* STAR

BARGAIN!



Model B	£399.00
Model B & Disk Interface	£469.00
Model B & Econet	£446.00
Model B & Econet & Disk	
Interface	£516.00
Teletext Receiver	£225.00
Official BBC Data Recorder	£29.95
Official Joysticks	£13.00
	200
BBC UPGRADES	
1.2 O/S	£11.50
Basic 11	£32.00
Disk Interface Kit	£97.00
Salar Market Company	
ECONET ACCESSORIES	-770-5
Ecconet Interface	. £70.00
Clock Box (Inc. PSU)	£45.00
Terminator Box (Inc. PSU)	

Printer Server Rom..... £49.00

File Server Level 1 ...... £99.00

File Server Level 2...... £249.00

10 Station Lead Set ...... £29.00

100M Econet Cable ...... £99.00



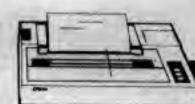
80 column, friction and adjustable tractor feed, bi-directional logic seeking HI-RES graphics and block graphics sub and super scripts, condensed and emphasised print, and underlining vertical and horizontal tabs, self test, italic print, etc.



High quality 80 column serial dot matrix printer. Dual density dot addressable graphics, quick tear facility as standard, optional sound reduction kit to give an impressive L55dBa acoustic noise rating. Ability to handle both tractor-fed fanfold and single paper.

Special price of ...... £249 **EPSON** Epson FX80 F/T £395 Epson RX30 F/T £305

£499



RITEMAN MATRIX PRINTER

Epson FX100 F/T



80 COLUMN · FRICTION AND PIN FEED · 120 CPS BI-DIRECTIONAL · HI-RES AND **BLOCK GRAPHICS · 9 x 9 MATRIX TRUE** DESCENDERS · NORMAL, EXPANDED, CONDENSED PRINTING · EMPHASISED AND DOUBLE STRIKE PRINTING . ITALICS PRINTING · AUTO UNDERLINING · SUBSCRIPT AND SUPERSCRIPTS · INTERNATIONAL CHARACTER SETS · EASY ACCESS DIPSWITCHES · 1:1 HIGH RES (TRUE CIRCLES AND SQUARES) · OPTIONAL TRACTOR UNIT · OPTIONAL RS232C INTERFACE

NEW

THE ULTIMATE MATRIX PRINTER AT UNBEATABLE PRICE

TRUE 160 CPS, STAR 80 COLUMN UHR PRINTER WITH 100% **DUTY CYCLE** UNBELIEVABLE FEATURES



160 CPS BI-DIRECTIONAL LOGIC SEEKING · STANDARD SPOOL RIBBON · UP TO 136 COLUMNS · 5, 6, 8, 10, 12 and 17 CHARACTERS PER INCH DOWNLOADABLE CHARACTER SETS (UP TO 384 CHARACTERS AVAILABLE) MACRO INSTRUCTION SET · PARALLEL AND SERIAL INTERFACE STANDARD . STANDARD WITH 8K BUFFER - 240 CPS WHITE SPACE SPEED · EMPHASISED AND DOUBLE STRIKE · SUPER AND SUB SCRIPTS · COLUMN SCAN BIT IMAGE GRAPHICS · ITALICS · FRICTION, TRACTOR AND ROLL HOLDER AS STANDARD

£395 DAISYWHEELS JUKI 6100 20 CPS max (13 CPS Shannon text) 10, 12, 16 CPI and proportional spacing up

protocols. Bold, shadow printing and underlining. 2K Buffer Standard ...... £395

to 220 characters per line, diablo



13 CPS. 10, 12, 15 CPI and proportional spacing up to 165 characters per line, colour printing, shadow printing, super/sub script, auto underlining, text reprinting.

3K Buffer Standard	
Brother HR15	£395
Keyboard	£160
Sheet Feeder	
Tractor Unit	

MONITORS PHILIPS TP200 **Green Monitor** 

**BROTHER HR15** 

You can use this latest Philips Green Monitor for personal computers, business computers, control systems, automatic test equipment, The picture quality of the TP200 means not only 80 x 24 lines of information but also usage for high resolution graphics.



AT THE **BARGAIN PRICE** OF £79

**NOW AVAILABLE** BBC Official 12" GREEN MONITOR RECOMMENDED BY DTI FOR SCHOOLS, EDUCATION AUTHORITIES & INDUSTRY. SPECIAL CASING, HIGH RESOLUTION.

MONITOR video and sound. An RGB cable for a BBC is supplied as standard.

£230

14" TV/MONITOR

NORDMENDE

14" TV/

This TV Monitor is not a modified television as many TV Monitors are. but a 14" TV/Monitor which has been designed to perform both functions. It has **RGB** and Composits

£95

With Remote Control £269

MICROVITEC 14" Colour Monitors Microvitec 1431 14" Std. Res...... £245 Med. Res..... £395 Hi-Res. ..... £495



WORD PROCESSING PACKAGE

BBC Model B plus Disc/Interface fitted view, V.D.U. Green Monitor. Daisywheel Printer. 200K Dual Disk Drives and manual and formatting disk. ONLY £1,329 (incl. all cables)

TCL DRIVES AT

LOW PRICES! SLIM DISK DRIVES

TEAC 55A S/S 40 TRACK	
100K Single	£165
200K Dual	£330
TEAC 55E S/S 80 TRACK	
200K Single	£199
400K Dual	
TEAC 55F D/S 80 Track	
400K Single	£255
800K Dual	£510
Power Supply Unit (Optional)	. £29
40/80 Switch	. £8
MITSUBISHI DRIVES	
400K D/S DD Single	£245
Dual	£435
ROM EXPANDER	

Double your sideway Rom sockets, with the TCL Rom expander.

Simple to install and very easy to use! Manufactured using components of the highest quality! Extremely reliable! ..... £18.95

View Word Processor	
UTILITY SOFTWARE Screen Dump Rom	£17.25
For EPSON, SHINWA, NEC. STAR	0

**NEW TCL MICROGUIDES** The KEYPLATES to make it easy!

WORD PROCESSORS

Microguide KEYPLATES fit neatly over your computer keys · Gives you an easy to read list of commands · Alphabetically arranged for immediate access · Placed exactly where you require it as part of your computer keyboard . The Keyplates, made of durable plastic, have space for function key notes · Clean-wipe pen for function key identity is supplied . + FREE ERROR MESSAGE BOOK, ALL FOR ONLY £5.95

SURE SHOT **BBC Compatible** KLIK STIK JOYSTICK -SELF CENTRING Two Fire Buttons Single - £17.95 Dual - £34

CABLES



Single	ve Ca	ables			
Dual	2200	Single		£9.5	0
Serial £25				£13.5	C
Serial	Print	er Parallel		£13.5	C
BBC Cassette Leads £3		Serial		£25	
	Cass	ette Leads	********	. £3	

FLOPPY	DISKS	
	Floppy Disks in packs of 10 Single sided 40 Track Double sided 80 Track	£20

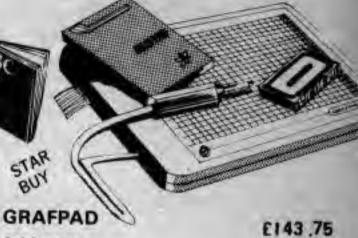
TCL VINYL DUS COVERS BBC ..... £3.50 Printer ..... £5.50 Monitor.... £4.50



**NOW AVAILABLE** THE ACORN ELECTRON ONLY £199

## 24hr DELIVERY

(subject to availability.)



Add new dimensions to your computer enjoyment. Create your own designs. Complete with Utility programmes.

Amazing value. Complete unit simply plug in -

£6.95

BOOKS BBC	
Micro's for Beginner's	£6.95
Advanced Prog Tech	£7.95
ALP on BBC (A.W.)	£7.95
Ass Lang for BBC (Shiva)	£7.95
ALP (Macmillan)	€8.95
Basic (Arnold)	£5.95
Basic (Mel-House)	£6.95
Basic Progs for BBC	£5.95
Easy Progs for Your BBC	£5.95
Expert GuideFunctional Forth	£6.95
Further Progs	£5.95
Games BBC Computers Play	£6.95
Games for Your BBC	£2.95
Graphics & Sound (Granada)	£6.95
In Education	£6.50
Introducing the BBC Micro	£5.95
Let Your BBC Teach You	£6.95
Advanced User Guide £12.95	
Micro Revealed	OCE GODE
Programming the BBC £6.50	
Putting Your BBC to Work £4.95	1
Structured Programming. £6.50 Using Floppy Disks £9.95	-
21 Games for BBC £5.95	-
30 Hour Basic	£5.95
30 + Progs	£4.95
35 Educational Progs	£6.95
36 Challenging Games for	
BBC	£5.95
Hobbit BBC (cassette)	
Hobbitt BBC (book)	£14.95
Brainteasers for BBC	£5.95
Best of PCW Software BBC .	£5.95
Graphics on the BBC	£6.95

\* SERVICE CONTRACTS TO EDUCATION AUTHORITIES AT DISCOUNT

Disk Companion.....

- \* OFFICIAL ORDERS FROM DEALERS. GOVERNMENT DEPARTMENTS, **COLLEGES AND** SCHOOLS WELCOME
- \* ALL PRICES **INCLUSIVE OF** VAT

**HOW TO ORDER** 

You may purchase any of the items listed by cheque made payable to: TWILLSTAR COMPUTERS LTD., Barclayerd or Access. All you have to do is fill your requirements on a separate sheet of paper. Post to us and we will dispatch within 24 hours subject to availability. All prices inclusive of 15% VAT. ADD £2.50 P&P for orders below £150. OVER, ADD, £8 P&P.

#### TELEPHONE ORDERS (01) 574 5271

CREDIT CARD HOLDERS MAY ORDER BY TELEPHONE. GIVE CARD NO. NAME, ADDRESS & ITEMS REQUIRED.



**Twillstar Computers Limited** 

17 REGINA ROAD · SOUTHALL MIDDLESEX · TEL: (01) 574 5271 (OPEN SIX DAYS A WEEK - 10 a.m. to 8 p.m.)

EMS

March 1984 MICRO USER 29



A GSL COMPUTING PUBLICATION

# 



The New Streamlined Winchester System

E-NET a flexible network system for the BBC microcomputer is now being installed within Education. "Doctor Challiners Grammar School" in Amersham are now operating a twelve station networking system using a 10 Megabyte Winchester Hard Disc unit.

Due to increasing demand for GSL Winchester System, GSL Computing Limited has appointed a distributor to cover the North U.K. Market.

The appointed Sole Distributor for the North U.K. Market is: Pace Software Supplies Ltd., 92, New Cross Street, West Bolling, Bradford BD5 8BS. Telephone (0274) 729306.

Read the next ISSUE of this magazine for further developments and information of the "GSL WINCHESTER SYSTEM" and newly appointed

## at 65L eniargeo

#### Peripherals always available

GSL has an extensive showroom displaying all their advertised products and more. Customers are encouraged to use the equipment on show and helpful advice and personal demonstrations are readily available.

GSL know from talking to their customers that nothing is more frustrating than responding to an advertisement and finding the advertised goods are out of stock or not readily available. GSL hold large stocks of all computer peripherals advertised.

The GSL range is constantly growing and currently includes:

- BBC MICROCOMPUTER
- SHUGART DISC DRIVE RANGE
- NEC PRINTERS EPSOM PRINTERS
- PRINTER BUFFER
- MICROVITEC COLOUR MONITORS SANYO COLOUR MONITORS
- GREEN SCREEN MONITORS
- TORCH Z80

input signals.

 VARIOUS SOFTWARE INCL. WORDWISE • PRINTER PAPER

#### **GSL Analogue Signal Display** & Analysis System

This systems enables a BBC Microcomputer (Model B) to function as a two channel, large screen, storage cscilloscope, for frequencies up to high audio values.

The basic system comprises an analogue to digital interface unit which is connected to the computer via the 1MHz bus. The accompanying software package enables input signals to be displayed in the time domain and also, if required, analysed via fourier transformation to give frequency domain representation.

The main features of the system are: 1. Two channel, large screen, display of signal amplitude vs time, with grid scaling information, channel identification and pk/pk measurement. 2. Repetitive or externally triggered sampling of

- NET allows up to 200 computers to share a common, large central disc store, and overcomes many of the inconvenient features of earlier network systems.

E-NET uses a hard disc unit as the central disc store, allowing upwards of 8 Megabytes of storage. It has effective, simple structures to limit the disc space available to any user, and to permit access by any user to library programs. Many users of the few simple networks installed so far have complained of the difficulty of monitoring pupil's use of disc space, but E-NET overcomes all these problems by doing the monitoring for you. You simply allocate a space limit to each user on the Hard Disc using the simple command program. For most schools and colleges this size disc will allow each user to have a reasonable file store, but it can be extended if required by adding further hard disc

#### GSL Announce the Hitachi 3" Disc Drive

Due to the ever increasing demand for reliable 3" disc drives, GSL are now marketing the proven Hitachi 3" drive. Ideal for Education the Hitachi drive is reliable and robust. Cased in rigid steel the drive is coloured to match the BBC Micro.

The compact disc which is now standard in Japan are strong and easily stored, like a music cassette. By simply turning the disc over they give 100K per side. The 3" discs encased in rigid plastic are also protected by a mechanical tab which prevents overwriting of

Like all GSL disc drives the Hitachi 3" drive runs off the BBC power supply thus saving considerable money over drives using their own power unit.

GSL have also ensured that all their disc drives are compatible. The Hitachi 3" can be run in tandem with the Shugart 514" drives.

\*Price including case, leads and utility disc £180.00 exclude carriage and packing and V.A.T.

- 3. Display time (total sampling period) variable from 0.002 sec. to 25 secs.
- Number of sample values = 100 per channel.
- 5. Minimum sampling time = 20 sec. (inclusive of
- both channels).
- Software controlled triggering delay available. 7. Option to list individual sample values.
- 8. Either the following or preceeding 'screen' of data is stored for each sampling period (the latter, only in triggered mode), and this may be displayed when required.
- 9. Fourier analysis of the data for either channel may be performed, and the frequency domain; representation plotted (50 values).
- 10. Up to 5 frequency domain plots may be stored internally and recalled for comparison with the
- 11. Full screens of information may be 'dumped' to a printer (NEC PC-8023B-C Dot Matrix Printer), for both the amplitude vs time and amplitude vs frequency displays.

The programme is loaded from tape using the command CHAIN "scope".

Price £350.00 Excluding carriage + VAT.

We are an official 🕮 Acorn Dealer and Service Centre

units. Important files can be easily copied to minifloppies if required.

E-NET has many useful extra commands. For example a simple command which only operates from the master (teacher's) machine, and which forces each client machine (in a certain specified room or area) to load and run a particular program is included. This is very fast, and flexible, and allows for efficient use of C.A.L. packages. Care has been taken to ensure that the command structure is simple enough not to intimidate the non-specialist, while remaining flexible and robust.

E-NET allows one or more printers to be connected to the network and although this is connected to one of the network computers this computer can still be used even while the printer is in use.

E-NET is fast, simple to use and versatile. The first system being installed for use in September, and demonstrations can be arranged.

#### **EDUCATION APPROVED DISC DRIVES** MATCHING ACORN BBC MICRO

All disc drives supplied in metal case finished to match the Acorn BBC microcomputer.

Shugart SA200 Capacity 100K - Price £149.95 including Leads.

Less than two-thirds the height of standard models, Shugart's single-sided SA200 5-25 inch minifloppy disc drive offers 125 or 250 Kbytes of capacity in a low cost highly reliable package. Low cost, compact size and high reliability make the SA200 an ideal choice for entry level desk top applications in personal computers, word processors, memory typewriters, portable computers or terminal add

Price £ 5 MB Winchester System - 1650.00

10 MB Winchester System - 1950.00

20 MB Winchester System - 2400.00

65 MB Winchester System - 4700.00 105 MB Winchester System - 5130.00

140 MB Winchester System - 7000.00

280 MB Winchester System - 9500.00



The complete system is compact and easy to use.

ons. Package includes all interconnecting leads.

Shugart SA455 Capacity 200K - Price £238.00 including Leads.

Shugart SA465 Capacity 400K - Price £281.50 including Leads. Prices excluding carriage and VAT.

Shugarts SA455/465 half height mini floppy disc drive offer a compact alternative to standard height drives for desk top systems requiring maximum performance in a greatly reduced space. Since users can quickly double existing storage capacity by fitting two drives in the space formerly occupied by one standard minifloppy the SA455/465 drives provided and excellent means to increase storage capacity without increasing space.

Return	to GS	LCOM	PUTING	LTD.
	terested i			
				CALLE.

(please tick)

The GSL Winchester System

20 up to 200 MB

The GSL Slim Line Disc Drives Your full range of Micro Computers and computer peripherals

GSL Analogue Signal Display and Analysis System

**GSL Printer Buffer** 

5 MB

10 MB

2 North Way, Andover, Hampshire SP10 5AZ

1	Aldress	
	Name:	

Position:

Company:

Address:

Phone: \_

Send me by return full technical information

or phone Rod Lewis on Andover (0264) 58744/51699

M.U.



Dealer Enquiries Welcome

GSL COMPUTING 2 North Way, Andover, Hampshire SP10 5AZ Telephone: 0264 58744 Telex: 47166





and get on with the real business of producing professional programmes for the microcomputer market, you need the UCSD p-system from Microtraffic Systems.

#### Program Development environments.

The UCSD p-system is the fastest growing software development system for microcomputers. Microcomputer manufacturers, software houses and more than 50,000 end users have already made the p-system their choice. And more are doing so every day. This is because:

· p-system users can write program modules in Pascal Fortran, Basic and Assembler and integrate them into a single application program.

single keystroke commands and a continuous display of available options, the operating system, editor, filer and other utilities are simple, yet sophisticated programs to use.

Ring Microtraffic today & we'll tell you the whole story.

MICROTRAFFIC SYSTEMS LTD., MELBOURN SCIENCE PARK MOAT LANE, MELBOURN, ROYSTON, HERTS SG8 6EJ. TEL: ROYSTON (0763) 62221 **TELEX: 817932 CAMTECH G** 









## TELESOFTWARE 'PATCHED' UP

CONSIDERABLE improvements have been made to the BBC's Telesoftware service, launched last Septemberto provide free software over the airwaves.

Previously there were

problems in downloading some Basic programs, but now a software patch broadcast over the telesoftware system allows any BBC Basic program to be downloaded onto a BBC Micro.

Not content with this, they have also provided patches which allow programs which make use of tokenised Basic to be broadcast, allowing more efficient use of the micro's memory.

Finally, a method has been developed which allows the broadcasting of machine code programs, considerably broadening

the range of software that can be broadcast.

Given this increase in the scope of the programs it can offer and the rumours that the BBC is going to provide proper funding from its software profits, the future looks set fair for the service.

problems

PROBLEMS with the

Tube have been delaying

the second processor

add-ons for the BBC

Micro, Acorn chief Chris

Curry revealed in a

speech at the opening of

the Acorn Information

difficulties were now over

and promised that the

Z80 second processor

would be available in the spring, followed by the

NS16032 in the summer.

Belgium he also released prices for the Advanced

Business Machine, due to be launched this summer.

Z80 and NS16032 second processor, prices

will range from £1,500 to

closed that Acorn plan to

market two or three of the

more popular BBC Micro

These plug into the

games on serial ROMs.

"ashtray" on the micro,

allowing instant loading

Chris Curry also dis-

£3,000.

of games.

Featuring an on-board

During his visit to

But he claimed the

Centre in Brussels.

solved

## Acorn smashes US sales target

THE BBC Micro is taking the United States market by storm with more than \$50 million worth of business being booked there in less than six months of trading.

This means Acorn in the States has already beaten its target figure for the first year by \$10 million - with six months still to go.

"We are progressing very favourably", Harvey Lawner, Acorn's general manager in America told The Micro User from his headquarters in Woburn, Mass.

"In fact, we have done far better than we believed possible in the fiercely competitive education market here" he said.

The company demon-

THE COMPUTER

strated its capability of showing a clean pair of heels to its rivals when it won its largest single order recently.

It beat both Apple and Atari in a public bid to provide 170 machines for a secondary school in Phoenix, Arizona.

And to cope with the ever increasing demand for the BBC Micro in the USA, a shipment of 1,000 machines was despatched from the UK last month.

Acorn got off to a flying start State-side by booking 8 million dollars worth of business even before its official American campaign was launched last September.

This was achieved despite jibes from United States experts that the British company would end up with egg on its corporate face.

One of the prophets of doom, Clive Smith of Boston's Yankee Group, a leading market research concern, was moved to say: "I'm not sure why they've targeted the education market here. It seems a shortcut to disaster".

Additionally some US analysts went on record as saying the BBC Micro was overpriced.

But Acorn has proved

them all wrong. So why has the machine been so successful to date?

"One of the reasons is because of our track record back in the UK", says Harvey Lawner. "Americans are still aware of the quality of education to be found in Britain.

"So when we tell them that 80 per cent of all computers in British schools are Acorns, they take notice. It's an excellent selling point".

This has been reinforced by the fact that in America, Acorn is offering up to 200 "schoolware packages", each including its own lesson plan.

"What we are able to give them are total solutions the like of which they have never seen before", claims Harvey Lawner.

## **Fibre optics** network

SYMBIOTIC Com-

Stations up to 9km

puter Systems has announced the first "Symbnet" local area network for the BBC Micro using fibre optics.

apart can be interconnected without electrical noise problems, claims Symbiotic, and the modular design allows the user to add stations wherever required.



Adverts like this are spearheading Acorn's American sales drive

## Five shows will be major draw

A SERIES of five shows devoted to the BBC Micro and the Electron are expected to attract more than a quarter of a million people this year.

Four of the shows are scheduled for London and one for Manchester.

Each will be held under the banner of "The Electron and BBC Micro User Show" and all five events are being sponsored jointly by The Micro User and its new sister publication, Electron User.

The London shows are to take place from March Westminster Exhibition Centre; July 19 to 22 at Alexandra Palace; October 25 to 28, also at Alexandra Palace; and from December 6 to 9, again at the Westminster Exhibition Centre.

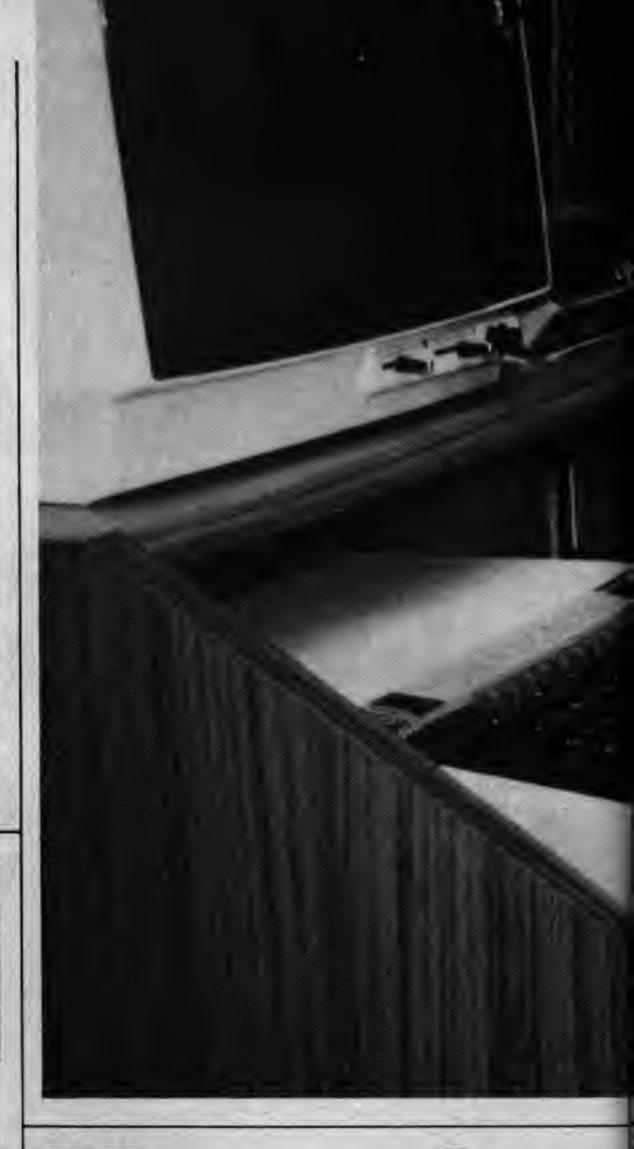
#### **Ambitious**

UMIST in Manchester is to host the single show outside the capital from August 31 to September 2.

"We are well aware that this is the most ambitious project ever to be undertaken by the organisers of computer shows", says Derek Meakin, joint managing director of Database Publications.

"But let us not forget we exist in a rapidly changing market. As a result, we will be able to unveil a batch of new and exciting products at each of the shows.

"The London shows in particular are to be held at around three month intervals — which is a long time in the computer market-place".



## More micro aid for handicapped

A WEST Midlands man who pioneered the use of "talking" BBC Micros for the blind is now looking at the problems of the mentally handicapped.

Bob Hinds, of Shrewsbury, who has appeared on Pebble Mill with his Dalek-voiced Beeb, is nearly blind himself.

He is two thirds of the way through an Open University computer science degree, and the BBC Micro helps him with his studies by telling him what is on the screen.

Now he wants to adapt one to help mentally handicapped children.

Last month Mr Hinds visited local sheltered accommodation for the mentally handicapped, where he demonstrated his equipment. "The effect was startling", he told Micro User.

Totally withdrawn patients with no speech ability responded to onscreen colour patterns and to the sound of their names on the speech synthesiser.

Some of them pressed the keys again and again to hear the machine say. their names.

Soon Mr Hinds is to meet parents of the handicapped children, along with hospital administrators, to discuss setting up a scheme for unlocking the hidden potential he believes the children possess.

He hopes to get the go-ahead this summer for a full-blown scheme, possibly with official funding. Failing that, he hopes for donations.

## Transfer program problem

THE recent controversy over software protection took a new turn with the temporary withdrawal of Clare's cassette-to-disc transfer program Replica.

Was this due to a previously undiscovered bug? Dave Clare said firmly: "Definitely not".

Declining to elaborate,
Dave refused to comment
on reports that a warning
shot had been fired across
his bow by one of the
largest producers of
software for the BBC
Micro.

"However", he continued, "we are glad to announce that Replica is now back on sale and we have great plans for the future".

In the meantime, Acornsoft have released further details of their cassette-to-disc exchange service for Acornsoft products. In exchange for the cassette, Acornsoft will supply a disc version of the same title at 50 per cent discount.

Customers should return the cassette (without the outer box), together with the money, to:

Disc Replacement Service, Acornsoft Ltd., c/o Vector Marketing, Dennington Industrial Estate, Wellingborough, Northants NN8 2RL.

## More micro

THE BBC celebrated the second birthday of its Computer Literacy project recently by publishing a book on its history and announcing three new micro orientated television series for 1984.

The booklet, "Towards Computer Literacy", gives a brief but thorough history of the project from its humble beginnings to the money spinning giant it has now become.

Aubrey Singer, managing director of BBC Television, described the project as "a story of success in high endeavour".

He felt that the project had resulted in the fact that "people have stopped being afraid of computers. Computer anxiety has become computer enthusiasm."

Evidence of this is shown by the three programmes planned for BBC television this year.

The first, "Computers in Control", is a series of five programmes giving an introduction to robotics, monitoring and control applications using the microcomputer.

#### Practical

In addition the National Extension College is producing a practical course on control for BBC Micro owners and the BBC Buggy will be available in kit form. The programme starts on BBC-2 on March 2, with two BBC-1 repeats during the week.

April 12 sees the start of the "Electronic Office",

#### Keith Waterhouse

THE more astute among our readers might have noticed that the eminent journalist, Keith Waterhouse, has "joined" the staff of Micro user writers.

The article "Impious Thought for the Day" was, with only minor adaptions, Mr Water-house's own work.

When it was submitted

- not by the author - we published it in good faith, and now apologise without reservation for having used it without permission or due credit.

Those of you who found Mr Waterhouse's style appealing will be interested to know that his latest book, "Mrs Pooter's Diary", is currently available.

#### GAMES ON THE BOX

FOR the first time games for the BBC and Electron are being advertised on TV, with Ocean Software promoting Mr Wimpy (BBC Micro), Hunchback (Electron) and Chinese Juggler (both machines).



## £5,000 BAIT TO BEAT PIRATES

A COMPUTER games company is offering £5,000 to anyone who can beat the software pirates.

THE BBC Micro is kid's

stuff for baby Gemma

Smith at her home in

industrial chemist father

Dennis devised a program

depicting a cat, he hasn't

been able to drag her

away from the keyboard.

For ever since her

Grimsby.

It's the cat's

whiskers

for Gemma

The directors of A & F Software - makers of the best-selling Cylon Attack and Chuckie Egg games say they are sick of having their best games copied.

Now they want a foolproof way of making their tapes copy-proof.

Already, they've had several replies to their offer, including one from a mystery sixth-former who insisted on a midnight meeting in a carpark.

And that's much to the

annovance of the other

three Smith children -

Wayne, aged 14, Andrew,

when she presses the

Escape key up pops the

cat, so we can't keep her

"Gemma knows that

12, and Darren, 9.

off it," says Dennis.

A & F director Martin Hickling told Micro User that some computer club members spend hours every week duplicating tapes for their friends thereby risking hefty fines or jail sentences.

Now A & F are mounting a two-prong anti-pirate campaign.

They intend to prosecute every pirate they catch for copyright infringement. And they plan to attack the problem at source by manufacturing copy-proof tapes.

## TV is scheduled

a series of five programmes presented by the evergreen Ian McNaught-Davis, who attempts to explain the revolution in office technology. BBC Publications also plan a book to accompany the series.

The programme will be seen on BBC-2 on Thursday evenings with a repeat on BBC-1.

Looking further ahead there are plans for a regular topical television series for micro users to start in the autumn, a sort of 'chip shop' for television.

1985 will see two further programmes. "The

Learning Machine", will be a series aiming to increase understanding of how the micro can assist learning, while "Technology and the Handicapped" will seek to explore the many possibilities of information technology for helping handicapped people.

### BARRY WOOD'S TAILPIECE

WE were chatting with one of those lovely people from Acorn the other day, and the subject of naughty foreigners copying the Electron came up.

"Oh I don't think there's much chance of that," commented one of Acorn's best. "We can't even copy the thing ourselves . . ."

OUR technical editor's wife rang up the other day to say he was ill.

"He's sitting up in bed writing flow charts for his programs - so he must be ill."

LOVELY little footnote at the end of a piece of software sent in for review to the effect that "when you've completed your review, please check up to see if we've released another version of it before you publish anything".

In other words, the

product supplied is fit enough to be sold to the public but not fit enough to be discussed in public ...

A PROGRAMMER, selling his latest game to a leading software house, asked for an advance of several hundred pounds for equipment to develop his latest idea on.

When asked what he wanted to use the money

for, he replied, "I'm going to buy a piano".

Was his next program going to be musical then?

"No, it's for my wifeto keep her busy so I can get on with my programming".

ACORNSOFT had to deal with one very irate customer, complaining that their 'compute-amate' program, I Do, was grossly innaccurate

- it proved he was compatible with his wife.

I WAS admiring the matching case used by one company for their latest BBC add-on.

"Acorn sold us some of their second processor boxes", said the proud designer.

Well, Acorn aren't using them for much at the moment, are they?

# BBC Soft sales top the £1m mark

BBC Soft has sold more than £1,000,000 of software since the start of the Computer Literacy Project – and they plan to sell a lot, lot more this year.

The list of proposed software releases by BBC Publications reads like a beginners guide to software for the BBC Micro.

Three titles will be released this month.

The first is Structured Basic, a book exploring the role of BBC Basic in writing well-structured programs. The book will be accompanied by a software cassette.

#### Absorbing

There will also be Game Core, a utility which, it is claimed, will aid the creation of simple and highly absorbing board games.

Finally there is Wargames, intriguingly called "a family computer

activity".

As might be expected, education is not being neglected, advanced music and science topics being among the further titles planned for later in the year.

# No BBC divorce, ACORN has hit out against "mischievous speculation" over the future of its contract with the BBC to market the BBC Micro. The company has been Says Acorn

## 'Mischievous speculation' rapped

Microcomputer System; many hundreds of new jobs have been created at Acorn and at its sub-contractors' plants.

The system has won international acclaim and is now making an important contribution to the British export drive; and, last but not least, the BBC has earned several million pounds in royalties from sales.

#### Achievements

All these achievements in the most competitive of all technology markets!

The BBC, surely, would have to have very strong reasons for breaking off such a successful collaborative venture to enter into a new partnership.

The more so, since educational establishments and viewers would be less than pleased to

discover that, having made a major financial investment in the BBC Microcomputer System, subsequent computer literacy programmes were to be based on a quite different microcomputer system.

The facts are these:

• Acorn enjoys a close relationship with the BBC and is collaborating with the Corporation on future computer literacy projects and products.

The present three-year agreement does not expire until August 1984 but, as is normal business practice, the terms of the new contract are already being discussed.

 As is also normal business practice, other microcomputer companies have approached the BBC.

 While the BBC did not seek tenders, we recognise that it is obliged to give proper consideration to proposals put forward by Acorn's competitors.

It is not true, incidentally, that if another manufacturer were chosen to produce the next generation of BBC computers, Acorn would be prevented from selling the present model altogether.

But that's hardly relevant. Contrary to mischievous speculation, we – and the BBC – are working towards renewal of the marriage vows, not a divorce.

Despite these words of assurance, it seems safe to speculate that the contract is not yet cut and dried.

For over at the BBC it still appears to be "make your mind up" time.

Aubrey Singer, managing director of BBC Television, let this out of the bag when he acknowledged that the Corporation is discussing new models with several manufacturers.

However he declined to say how many firms were involved.

Meanwhile other top sources in the Corporation are adamant that there is no reason to talk to anyone other than the tried and trusted Acorn.

## ACORN CHIEF WINS 'OSCAR'

A COMPUTER industry Oscar has gone to Hermann Hauser, the Acorn executive with overall responsibility for the company's research and development.

The joint managing director of Acorn was recently named as winner of this year's RITA (Recognition of Information Technology Achievements) award as personality of the year.

As he is currently on company business in Japan, he was unable to attend the presentation ceremony in Birmingham, so his wife Pamela received the trophy on his



particularly displeased by

reports which suggested it

may lose out to a

competitor when the

agreement comes up for

renewal in August this

has released an official

statement denying any rift

exists and claiming that

the two organisations are

"working towards the

renewal of the marriage

The full text of the

Some reports that

Acorn Computer's

three-year relationship

with the BBC could soon

be terminated overlook

some pertinent facts

which ought to suggest

BBC and Acorn has been

- and continues to be - an

outstanding British suc-

BBC Microcomputers,

which are designed and

marketed by Acorn, have

been sold, with sales

currently running at

25,000 units per month;

eight out of ten schools

with microcomputers

have chosen the BBC

More than 250,000

The alliance of the

vows, not a divorce".

statement reads:

the opposite.

cess story.

In the light of this, it

year.

Hermann Hauser

behalf from Ian McNaught Davis, who fronts the BBC Series "Make the Most of Your Micro".

Hermann Hauser holds a doctorate in physics from Cambridge where he attended the world famous Cavendish Physics Laboratory.

It was while he was involved in post doctorate studies that he met Chris Curry, his fellow joint managing director. As a result, they eventually formed Acorn in December, 1978.

Another RITA went to Micronet 800, which received the award for the most outstanding system innovation in 1983.

This is the first time that any part of British Telecom's Prestel network has won an award for its service. It comes less than a year after launching the telesoftware venture.



Pamela Hauser receives the award on her husband's behalf from Ian McNaught Davies

# Add 2016 to your BBC micro in five minutes

-ARIES-B20-

#### Features

- ★ Adds 20K of useable RAM to your BBC Micro
- ★ Run programs up to 28K long in ANY SCREEN MODE
- ★ Extra memory can be used directly from BASIC I and II, VIEW 1.4, FORTH, LISP, and many other existing programs
- ★ ARIES-B20 is compatible with all correctly written BBC Micro software, on cassette, disc, sideways ROM or cartridge
- ★ Don't be deceived: this product is unique – no other expansion unit has these capabilities
- ★ Complete compatibility –ARIES-B20 uses only documented MOS facilities
- ★ Fitted in 5 minutes using only a screwdriver
- \* Simply plugs in inside the case
- \* No soldering or cutting
- ★ (Unlike some add-on products) will cause no damage to your

- BBC Micro can be removed at any time
- ★ Incredibly simple to use
- ★ Patent applied for
- ★ Designed in Cambridge by BBC Micro experts
- \* Top quality manufacture
- ★ Unquestionably the most important add-on ever produced for the BBC Micro
- ★ Top software houses are racing to produce the "superprograms" made possible by the extra capacity
- \* 1 year guarantee.
- \* Available mail-order only
- ★ Official purchase orders accepted from bona-fide educational establishments, all other trade cash-with-order

- ★ Price £99.95 including post, packing and VAT
- ★ If not completely satisfied with your purchase, we will refund your money in full providing you return the ARIES-B20 in good condition in its original packaging within 14 days

#### Machine requirements:

- \* BBC Micro model B
- ★ MOS 1.2 or later
- ★ Plugs into CPU socket and 1 sideways ROM socket

Also available IEEE-488 interface. Coming soon: Compatible ROM expansion board.

#### How to Order.

Send cheque or postal order made payable to: Cambridge Computer Consultants Ltd and forward to: Cambridge Computer Consultants Ltd, FREEPOST, Cambridge CB1 1BR. Telephone Cambridge 0223- 210677

	Please send me (Qty)ARIES-B20(s) at £99.95 (incl. p.p. & VAT I enclose a cheque/postal order made payable to
	Cambridge Computer Consultants Ltd for £
	Signed
Ñ	Name (block letters)
	Address

Cambridge Computer Consultants Ltd, FREEPOST Cambridge CB1 1BR
Telephone Cambridge 0223-210677

# BBC MICRO MANCHESTER

# BBC MODEL ONLY £499

includes Disc Interface and Wordprocessor

**BBC MODEL B BBC MODELA**  £399 BBC MODEL BD

£259

£469 £299 (Model B with Disc Interface)

**ELECTRON £199** 

All BBC Computers come with free cassette leads

**DISC DRIVES** Complete – No hidden extras £179

100K SLIMLINE 55A (200K) 400K SLIMLINE 55F (800K)

Disc Drive Kits from £90 + VAT

D/D Blank Diskettes (fully guaranteed) only 1.49 each

## C A TECH

COMPUTERS



184 Market Street, Hyde, Cheshire SK14 1EX

061-366 8223

PRICES ...

All our prices are constantly moving, so please ring us to check the latest price.

**NEW 3" MICRO DRIVE** 

ONLY £129.95 all inclusive

Complete 3" DISC SYSTEM with interface ONLY £198.95

INTERNAL ADD-ONS Includes fitting while you wait.

£79.95 Acorn DFS LVL Double Density DFS £89.95 Acorn Speech Synthesiser £55.00

CTECH Chip Chat £39.95 View Wordprocessor £59.00 Wordwise Wordprocessor £39.95

MONITORS

Microvitec £249 Sanyo Green Screen £89 Fidelity TV/monitor only £228.85 BMC Green Screen only £99

BBCANALOGUEJOYSTICK ONLY £14.95

PRINTERS includes Cables, Paper and Screen Dump Programs.

#### STAR 10-X

120 CPS, 10 character sets, down loadable character set, friction, tractor, roller feed. Centronics I/F, true descenders, etc.

**ONLY £269** 

#### SILVER REED **EXP500** DAISYWHEEL

A daisywheel at low cost from a company with backup!

ONLY £299.00

+ VAT

#### MODEMS **OEL 200 PRESTEL MODEM**

with 1200/15 and 1200/1200 at the amazing price of

£79.95 + VAT

Prestel and Micronet software available NOW!!

#### SECOND PROCESSORS

Z80 64K RAM £299 + VAT Z80 64K RAM with SAGE or PERFECT software £375 + VAT 6809 64K RAM FLEX O/S £289 + VAT

#### SECOND PROCESSOR SOFTWARE

SAGE INTEGRATED ACCOUNTS: Sales, purchase, stock control - included with Z80 64K RAM card only £375 + VAT

Available for 6809:

Pascal, Cobol, Forth compilers. Also 6800, Z80, 6809 and 6800 Assemblers and Cross Assemblers.

#### FREE DELIVERY TODAY (Orders over £90)

If you are in Greater Manchester, Cheshire, Lancashire, Merseyside, West Yorkshire or South Yorkshire, if you ring us now we can send one of our highly trained staff to install your computer equipment Today.

AS USUAL LOADS OF SOFTWARE AVAILABLE

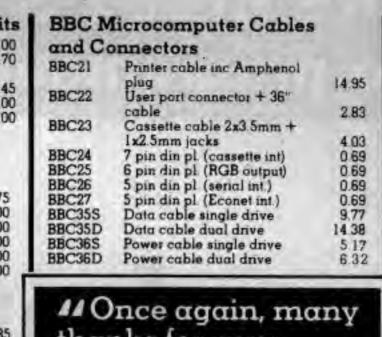
RING 061-366 8223

11 I was pleasantly surprised to receive your parcel yesterday only 2 working days after I first wrote to you - not many suppliers in the small computer market manage such a fast turnaround time.

J.L. London

			ä
BBC M	icrocomputers Price f	inc VAT	Ī
ANBO1 ANBO2	BBC Microcomputer Model B BBC Microcomputer Model	The last section in	I
	B+ Econet	447.51	ı
ANB03	BBC Microcomputer Model B + Disc	498 19	
ANB04	BBC Micro Model B + Disc & Econet	545,20	L
BBC M	icrocomputer Compa	tible	1
Disc Dr			N
BBC31S BBC31D BBC32S	Single 100K drive Dual disc drive 2x100K Single 200K double sided	201.25 362.25	
BBC32D	drive	258.75	r
2000	Dual double sided disc drive 2x200K	483.00	I
BBC34S	Single 400k double sided 80 track disc drive. 40/80 track	000.05	ı
BBC34D	Switchable Dual double sided 80 track disc drive 40/80 track	327.75	I
All disc dr utilities dis	switchable ives supplied with connecting co sc and manual	The second of the second	
BBC M	icrocomputer Compa	tible	ı
Floppy			ı
BBC40TS	Single sided 40 track discs Box of 10	17.25	ı
BBC40TD	Double sided 40 track discs Box of 10	28 75	ı
BBC80TD		36.80	
BBC M	icrocomputer Compa	135 S. P. P.	
Monito	Applications and the second se	LL	
14MON	Microvitec 1431 colour	-979	
12MNON	monitor NEC 12" high resolution	247.25	
9MON	monitor Green phosphor NEC 9" high resolution	159.85	4
STAND	monitor Green phosphor Monitor stand	148.35	ı
MEASURE STORY	A Control of Marian	100000	1
	icrocomputer Accesso	5. 2-#33331na	ľ
ANC01 ANC04	2nd Processor 8502 2nd Processor 280	195.50 339.25	I





thanks for your speedy and efficient service. II B.Y., London



11 Thank you for your prompt, helpful service. J.W., Langley, Berkshire

11 I am impressed with your quick and efficient service. R.N., Peterborough

Acorn & Acornsoft Books 7.50 7.50 7.50 7.50 2.50 2.50 SBD01 Creative Graphics SBD02 Graphs and Charts SBD03 Forth SBD04 Lisp View guide SBD07 Into View SBD08 15 00 SBD10 BCPL Manual ANJOI BBC37 User Guide CCU DFS Manual **BBC Microcomputer Compatible** 

Printers RX80 31050 Epson RX80 printer 425 50 FX80 Epson FX80 printer Box listing paper 2000 sheets 14.95 LIST

SPECIAL TELEPHONE NUMBER DISS (0379) FOR FAST, IMMEDIATE SERVICE, 89875.



Carriage Charges Computers, Monitors, & Printers by Disc drives, paper, 2nd Proc, Teletext

8 63

5.75

115

Normal post Books and joysticks by normal post All other items by normal post

Terms All items offered subject to availability
All prices include VAT which is charged at the prevailing rate (currently 15%) as shown above. Government, Local Authority and educational establishment official orders welcome. Account facilities available subject to status

otherwise strictly cash with order. Credit cards (Access & Visa) accepted with no surcharge on all items except BBC Microcomputers.

Full refund, if requested, on out of stock items.

Most items are available ex stock and orders received up to 3PM will be despatched the same

Guarantee

All products are guaranteed for 12 months from date of purchase irrespective of original equipment manufacturers quarantee

Telephone Orders

24 hour service (ansaphone after hours) available for telephone orders

Prices: all prices INCLUDE V.A.T. but NOT carriage. Please add the carriage to your order.

II Fantastic service-I wish more people were as 'on the ball' as you are. ??

T.P., Tiverton, Devon

# If you think our prices are keen, wait 'til you try our service.

#### Quality:

ANE01

BBC45

Teletext receiver

Pair of joysticks

We only sell prime branded products from the industry's leading manufacturers such as Texas Instruments, Motorola, National etc. They are all current production with recent date codes. We do not buy sub standard products, manufacturers surplus or job parcels.

225.00

13.00

#### Reliability:

All systems products are fully tested before despatch and are guaranteed to be in good working order. All faults reported are fully investigated and promptly put right. Investigation has revealed that the vast majority of these faults have occurred as a result of damage caused in transit.



#### Service:

All orders received by 3.30 pm are despatched that same day by 1st class post or Datapost, stock permitting. Better than 95% of the product range is in stock in depth at any one time.

#### Value for Money:

Due to our bulk buying power and low overheads we are able to offer very attractive prices for even modest quantities. A straight comparison of our price list with any franchised distributor will reveal a huge difference - in some cases our price is a third of the competition. There are no minimum order charges and our post and packing costs are actual costs.

For FREE CATALOGUE post to Midwich Computer Company Limited, Rickinghall House, Hinderclay Road, Rickinghall, Suffolk IP22 1HH.

Name

Address

Telephone

# Part 11 of MIKE BIBBY'S introduction to programming

AS promised last month, we'll be covering colours this time, and seeing how easy they are to use.

In fact, before I give you the theory, try running Program I, and see what happens:

10 REM \*\*\* PROGRAM I \*\*\*
20 MODE 5
30 COLOUR 1
40 PRINT' "Colour 1"
50 COLOUR 2
60 PRINT' "Colour 2"
70 COLOUR 3
80 PRINT' "Colour 3"

It writes in three different colours! The way you get the micro to change the colour of its writing (we should really say text) is to use the COLOUR command.

COLOUR 1 causes it to print text in colour 1 from then on. In Mode 5 colour 1 is red.

COLOUR 2 causes text to be printed in colour 2. As you can see, in Mode 5 this is yellow.

COLOUR 3 obviously gives white.

So, in Mode 5 COLOUR 1 gives red text, COLOUR 2 gives yellow text, and COLOUR 3 gives white text. Actually, you can fiddle with this, but more of that later.

When you think about it, there are four colours on the screen — the red, yellow and white writing in the foreground plus a black background.

You can actually choose to write in black if you want to by using COLOUR 0, but you won't notice it against the black background. If you don't believe me try adding these lines to Program I:

> 90 COLOUR 0 100 PRINT " "Colour 0"

Now Mode 5 is a four colour mode, as is Mode 1. Can you remember the difference from last month? If not, try altering line 20 of Program I to:

20 MODE 1

and then run the program.

That's right, Mode 5 gives you 20 characters per line and Mode 1 gives you forty. The colour numbers still refer to the same colours, though.

What happens if we alter it to a two

# Let's dip into the Micro's colouring box

colour mode? Change line 20 to:

20 MODE 0

You should only see "Colour 1" and "Colour 3" displayed, both in white. "Colour 2" has disappeared. This is because in this mode you have only two colours to play with, black and white.

As before, COLOUR 0 gives black. COLOUR 1 then has to be white. When it reaches COLOUR 2, the micro has run out of fresh colours so it goes back to black – hence the disappearance of "Colour 2".

The next colour is then white so Colour 3 appears as white. I think you can guess what COLOUR 4 and COLOUR 5 produce!

Now try Program II. At first glance this should produce the same results as Program I, this time using a loop. However, all is not as it seems, since it's in Mode 2, a 16 colour mode. Try running it and see.

10 REM \*\*\* PROGRAM II \*\*\*

20 MODE 2

30 FOR loop%=0 TO 3

40 COLOUR 100p%

50 PRINT' "Colour "; loop%

60 NEXT loop%

COLOUR 1 still gives red, but COLOUR 2 now gives green, and COLOUR 3 yellow.

An important point coming up. These colour numbers do not mean fixed colours. As we've just seen, 2 is not

always yellow, 3 not always white, and so on. The meaning of the colour numbers varies according to mode.

To sum up, the meaning of the colour numbers depends on the "logic" of the situation. So they are officially called logical colour numbers.

So, in the correct jargon, COLOUR 2 causes foreground text to be written in logical colour 2. As we have seen, in Mode 5 this is yellow, in Mode 2 it is green and in Mode 0 it is black.

The point is that logical colour numbers can be interpreted as different actual colours on the screen depending, for instance, on the mode.

To see all 16 colours in Mode 2, alter line 30 to:

30 FOR loop %=0 TO 15

and run it. Notice that it's 0 to 15 - this does in fact give 16 different colours!

The logical colours from 0 to 7 should be fairly obvious, but what's going on with all those flashing colours from 8 to 15?

Well, logical colour 8 flashes between black and white, logical colour 9 between red and cyan, and so on. If you can't make out all the pairs yourself, Figure I summarises them.

It may seem odd that there are two pairs flashing between black and white. This is because colour 8 flashes black then white, while colour 15 flashes white then black.

None too clear, is it? Program III should help.

10 REM \*\*\* PROGRAM III \*\*\* 20 MODE 2 30 COLDUR B 40 PRINT TAB(0,12) "Colour 8" 45 COLDUR 15

50 PRINT TAB (0,13) "Colour 15"

This shows that while they flash between the same two colours, they are not in step. When colour 8 is showing white, colour 15 is showing black and vice versa. The same logic applies for the other flashing pairs.

One irritating point about Program III is the fact that it leaves text in colour 15 - everything you type in flashes. Most annoying!

You can stop this by entering:

COLOUR 1

after which the rest of the text will appear in red.

So far the logical colour numbers we've been using have changed the colour of the foreground text. Let's try altering the background colour.

Change mode with:

MODE 5

Then enter:

COLOUR 129

and then type in some random letters.

Hey presto, you still get white letters, but each individual letter is on a red background.

What happens is that if you want a red background to your numbers you simply add 128 to the logical colour number for red (1) and use the sum in the colour statement. Hence the use of COLOUR 129.

So, to put the letters on a yellow background you would use 128 plus 2, the logical colour for yellow. That is, COLOUR 130.

However, white letters on a yellow background look awful, so let's change the foreground text colour to red at the same time.

Entering:

COLDUR 130 COLOUR 1

should have the desired effect.

Actually we could have achieved this by entering the one line:

COLOUR 130: COLOUR1

The colon separating the two statements allows us to put them on the same line. It's the Basic equivalent of putting a full stop between sentences.

Try:

#### COLOUR 2: COLOUR 129

Can you work out how this gives you yellow foreground text on a red background?

Now, when we changed background colours, only the background of

Program IV illustrates the background colours available. Each time through the loop (lines 30-80), the background colour is increased and line 40 chooses a new background colour (loop%+128) as loop% increases each time through the loop, and line 50 clears the screen to this colour.

Line 60 prints out the new colour number for all the world to see, while line 70 introduces a pause, by waiting for a key to be pushed. The loop then

FLASHING	COLOURS
Colour pair	Logical colour number
Black-White	8
Red-Cyan	9
Green-Magenta	10
Yellow-Blue	- 11
Blue-Yellow	12
Magenta-Green	13
Cyan-Red	14
White-Black	15

Figure I: The logical colours' flashing pairs

subsequent text characters has been altered.

At the moment the background colour is red. Try:

CLS

The whole screen is cleared to the background colour, so from now on your characters appear in a yellow foreground on a red background.

To prove that Colour 0 really does give a black foreground text - I'm sure you still doubt me - try:

COLDUR O

and type away. All should be revealed!

10 REM \*\*\* PROGRAM IV \*\*\*

20 MODE 2

30 FOR 100p%=0 TO 15

40 COLOUR 100p%+128

50 CLS

60 PRINT TAB(0,15) "Background

Colour"; 100p%+128

70 pause\$=6ET\$

80 NEXT loop%

90 COLOUR 128

100 CLS

takes you onto the next background colour.

Lines 90 and 100 are to ensure that you aren't left with an annoying flashing background when you drop out of the bottom of the loop.

10 REM \*\*\* PROGRAM V \*\*\* 20 MODE 2 30 FOR 100p%=0 TO 15 40 background%=loop%+128 50 COLOUR background%:CLS 60 PRINT TAB(0,15) "Background Colour"; background% 70 pause\$=GET\$ 80 NEXT loop% 90 COLDUR 128:CLS

Program V does exactly the same as Program IV, and if you look carefully you'll see that it's equivalent - I've just used a variable (background%) instead of loop%+128 (it's calculated in line 40). I've also put the CLS on the same lines as the Colour statements (lines 50 50 and 90), separating them with colons.

Well, that's all for this month. I told you it was easy! More on colour next month.

# WATFORD ELECTRONICS



Dept. BBC, CARDIFF ROAD, WATFORD, HERTS. ENGLAND.
Tel: Watford (0923) 40588/37774 Telex: 8956095 WAELEC



#### BBC MICROCOMPUTER

Model A-£260; Model B-£346

Upgrade your Model A with our Upgrade Kits and save yourself £ s s s

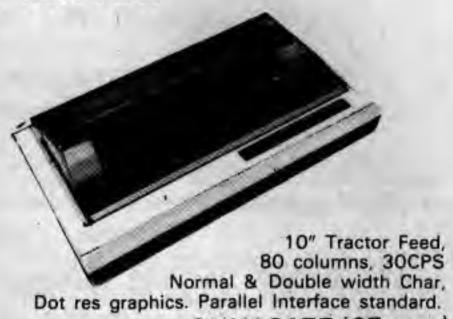
BBC1 16K Memory	500000
(8 x 4816AP-3 100nS)	£24.00
BBC2 Printer User I/O Port	£8.10
BBC3 Disc Interface Kit	£95.00
BBC4 Analogue I/O Kit	£8.25
BBC5 Serial I/O Kit	£8.50
BBC6 Expansion Bus Kit	£7.75
<ul> <li>Complete Mod. A to B Upgrade Kit</li> </ul>	£55.00

#### **Dust Cover for BBC Micro**

Protects your expensive Micro from foreign bodies. £3.95

#### BBC PRINTER

GP100A



ONLY £155 (£7 carr.)

#### INTERFACE CABLE

BBC to Seikosha Cable £8.00

DUST COVER for GP100 £3.95

#### FRICTION FEED

Attachment for GP100A or 250X Printers £26

<ul> <li>Spare RIBBON for GP80</li> </ul>	£4.50
Spare RIBBON for GP100	£4.95
Spare RIBBON for GP250	£5.95

GP-700 Colour Printer Screen-dump routine in ROM FOR BBC Micro £12



100 CPS, 9 x 9 matrix, dot addressable graphics, condensed and double width printing. Normal, Italic and Elite Graphics. Tractor feed, 10" max width, bi-directional, logic seeking. Centronics Interface standard.

ONLY £235 (£7 carr.)

#### **RX80 F/T PRINTER**

As above but has both Friction and Tractor Feed.

£259

#### **Epson FX80 Printer**

160 CPS, 11 x 9 matrix, proportional spacing, superscripts, subscripts, dot addressable graphics. Normal, Italic and Elite characters. Up to 256 user definable characters. Down loadable character set. Condensed and double width printing. Full proportional spacing. Four user defined margin positions. Tractor and Friction feed. 10" maximum width Bi-directional, logic seeking Centronics interface standard.

ONLY £345 (£7 carr.)

#### **Epson FX100 Printer**

Same as FX80 but has a 15" wide Carriage

£495

	Ribbons	<b>Dust Covers</b>
MX80FT	£4.75	£4.50
MX100	£10.00	£5.25
FX80	£4.75	£4.95
RX80	£4.75	£4.50

#### PRINTER INTERFACE BUFFER

Neatly packaged self contained box, supplied complete with all leads, manual and detachable power supply.

Price: 16K Unit £99
Price: 48K Unit £135

#### **BROTHER HR-15**

DAISY-WHEEL PRINTER

An exceptionally high quality daisy wheel printer at the price of a dot matrix printer. 18CPS; bi-directional, 3K of buffer; has clear buffer facility, carriage skip movement, proportional spacing; underlining; bold print and shadow print. Prints in two colours; super and subscript facility. Impact control facility to vary pressure on paper for making carbon copies. Has Centronics parallel or RS-232 interface. Connects directly to BBC Micro. A ribbon cassette plus a separate red ribbon. Optional extras: single sheet feeder takes up to 150 A4 sheets; a keyboard that transforms HR15 into a sophisticated electronics typewriter. Attractively finished in beige.

#### Special Introductory Offer

ONLY £375

£199
£150
£3
£18

#### LISTING PAPER

8½" or 9½" Fanfold paper plain or ruled (1000 sheets) £7 (£1.50p carr.)

15" Fanfold paper (1000 sheets)

£9 (£1.50p carr.)

Teleprinter Roll (econo paper) £4 (£1.50p carr.)

#### **PRINTER LEAD 36"**

Ready made printer lead to interface BBC Micro to EPSON, SEIKOSHA, NEC, etc., Printers.

ONLY £8

Special Extra long (60") Cable

#### DATA RECORDER & ACCESSORIES

Top quality Slimline, portable Data Recorder for computer use. Mains/Battery, operated with counter

DATA RECORDER CABLE
For our Data Recorder to BBC Micro

£24.0/

For our Data Recorder to BBC Micro

DATA CASSETTES Top grade C12 Data

Cassettes in library cases.

#### STAK-PAK

The unique computer program filing and storage system. Made of tough black plastic these compact drawer sections hold two cassettes each and lock together

and lock together
vertically to form miniature cabinets of any
height. Each drawer section has two Agfa C12
Cassettes with labels plus external index card.
Five twin Paks (10 Cassettes)

Five twin Paks (10 Cassettes)
(Postage £1.00) £6

#### DISC DRIVES (CUMANA)

(All Drives new slimline 51/ type)



DRIVES WITHOUT POWER SUPPLY

TEC Slimline, Uncased, Single Sided 40

£125

£325

£230

track, 5‡", 100K ● TEC Cased, Single Sided 40 track,

100K incl. Cables £139 • LCS400 MITSUBISHI, cased, Single, 80 track, Double sided, 400K plus Cables £199

LCS400S MITSUBISHI, cased, Single
 80 track, 40/80 track switchable, Double
 sided, 400K with cables
 LCD800 MITSUBISHI, cased, Twin,

80 track, Double sided, 800K plus Cables £375

• LCD800S MITSUBISHI cased, Twin,
80 track 40/80 switchable. Double sided

80 track 40/80 switchable, Double sided, 800K with cables £425

CASED DRIVES with POWER SUPPLY
CS100 TEC Single, 40 track, single sided,
40 track, 100K
£165

CD200 TEC Twin, 40 track, single sided, 200K
 CS200 TEC Single 80 track single

CS200 TEC Single, 80 track, single sided, 200K

CD400 TEC Twin, 80 track, Single sided, 400K

e CS400 MITSUBISHI Single, 80 track,
Double sided, 400K £299

Double sided, 400K £299

CS400S MITSUBISHI Single, 80 track,
Double sided, 40/80 switchable, 400K £340

CD800 MITSUBISHI Twin, 80 track,
 Double sided, 800K
 CD800S MITSUBISHI Twin, 80 track,

Double sided, 40/80 switchable, 800K £550

Carriage on Drives £7 (Securicor)

#### 51" DISKETTES

(2 years warranty) 10 WABASH Diskettes S/S £15 10 WABASH Diskettes D/S £25 (Lifetime warranty) 10 Verbatim or 3M Diskettes S/S £17 • 10 Verbatim or 3M Diskettes D/S £27

#### DISC ALBUMS

Attractively finished in beige leatherlook vinyl. Stores, protects and displays 20 discs in double-sided clear view pockets. **ONLY £4.95** 

#### PLASTIC LIBRARY CASES for Disc Storage 51" (holds 10) £2

#### **LOCKABLE STORAGE UNITS**

Attractively finished, strong beige plastic base fitted with dividers. Smoke acrylic top. Supplied with adhesive title strips for ease of filing.

 M-35 Holds upto 35 mini discs M-85 Holds upto 85 mini discs

£14 £18

#### FLOPPY HEAD CLEANERS

Unless your office/home is dust free, you should clean heads at least once a week to avoid the risk of cross contamination.

Simply apply the cleaner to one of the specially formulated cleaning discs, insert into the drive and initialise. If your system has no initialisation program then insert the disc and open and close the door 5 times.

£16.00

#### **BBC Micro** WORD-PROCESSING PACKAGE

A complete word processing package consisting of: BBC Model B, Zenith 12" Green or Amber Monitor, Twin 200K highly reliable (1 year warranty) Twin Cased Cumana Disc with own power supply, the popular WORDWISE word processor, Watford's own highly sophisticated 62 File DFS interface fitted, the world renowned Brother HR15 Daisy Wheel Printer, Gemini's Beebplot & Beebcalc Spreadsheet Analysis Software discs, 10 blank diskettes. 500 sheets of fan-fold paper. Manuals and all the leads.

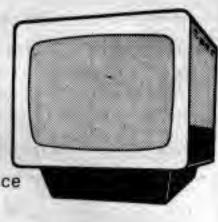
All you require is a mains power point to have it up and running (we even supply the 4 way mains trailing socket).

ONLY £1,350 (carr. £15)

(P.S. We will alter the package to suit your particular requirement. Call in for a demonstration.)

#### MONITORS

**MICROVITEC 1431** 14" Colour Monitor, RGB Input, (as used in BBC programmes) FREE Interface Lead. £205



£3

 MICROVITEC 1451 Hi-res 14" Monitor incl. lead £319 NEW MICROVITEC 14" Colour Monitor/Composite Video £249

 KAGA RGB 12" Medium Resolution Colour £210

KAGA RGB 12" High Resolution Colour £259 KAGA 12" Standard resolution colour

MONITOR/COMPOSITE VIDEO ONLY £219 **BNC** Connecting Lead RGB Connecting Lead

 ZENITH 12" Green or Amber Monitor Hi-resolution £75

Carriage on Monitors £7 (Securicor)

#### **READY-MADE LEADS**

CASSETTE LEADS 7 pin DIN Plug to 5 pin DIN Plug + 1 Jack Plug £2.00 to 3 pin DIN Plug + 1 Jack Plug £2.00 to 7 pin DIN Plug £2.50 to 3 Jack Plugs £2.00 6 pin DIN to 6 pin DIN Plug (RGB) £2.50 Monitor Lead, BNC to PHONO £3.00

Disc Drive to BBC Micro Power Lead Single: £3.00 Dual £3.75

#### NEW Mk II 13 ROM SOCKET BOARD

Now all lines fully buffered - On board battery back-up facility - will accept 2716, 2532, 2764 and 27128 ROMs.

Simply plugs into one of the four ROM sockets currently available in BBC Micro. There are only 5 solder connections to be made. Full instructions are supplied.

Our 13 ROM SOCKETS BOARD enables the User to increase the Sideways ROM capacity the basic four sockets on the main board upto the full SIXTEEN capable of being supported by current operating systems. In addition the board is designed with the facility to hold upto 16K RAM, which when switched into operation is automatically selected by any WRITE signal to the Sideways ROM area. This gives the User the ability to write a utility or language and upon pressing break have the utility or language up and running (new ROM software can be developed and tested in situ.)

The Board gives the User, plenty of freedom to explore the possibilities of the new paged ROMs due in the coming months and offers them the

chance to develop their own. All lines are fully buffered and the Board meets or exceeds all timings for operation in the BBC Microcomputer. When fully populated, the ROM Board consumes less than half the recommended

Supplied ready-built and tested complete with fitting instructions.

maximum current limit.

ONLY £29.95 (carr. £1)

#### **EPROMS & CMOS RAMs** for BBC

2764-250nS (8K ROM) £5.95 27128-250nS (16K ROM) £18.00 6116-150nS (2K RAM) £4.75 6264-150nS (8K RAM) £26.00

#### **Z80A 2nd PROCESSOR BOARD** for BBC Micro

 Although intended as a BBC add-on, it is totally stand alone (i.e. Can be used with any RS232 Terminal/Computer).

 Z80A Processor running at 4MHZ (No. wait states) 64K Dynamic Memory, 16K ROM space. Disc interface with single/double density, 40/80 track, single/double sided. Two serial channels at independent BAUD rates. Parallel printer interface.

 No additional drives are needed other than those already being used on the BBC as the disk drives can be shared or can be run on the Z80A Processor alone. (This unit can be operated without the disc interface inside the BBC.)

 EXPANSION - OPTIONS IEEE-488 GPIB Interface with Control, Talk and Listen Ram in 64K and 192K increments Hard DISC INTERFACE (to controller)

**Dual Parallel Interface** 8" Floppy Disc Controller **Dual Serial Interface** Real Time Clock

Prototypeboard (Also another 64K Ram card can be plugged

inside the unit) CP/M 2.2 - Not a lookalike, making the CP/M Users Group available to you.

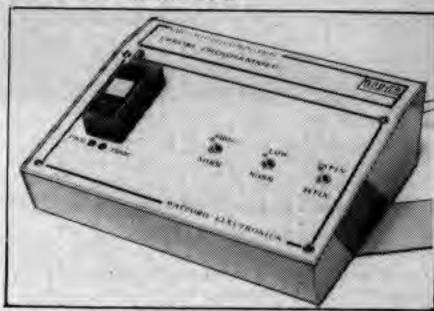
 All BBC screen, sound and OSBYTE facilities available to the CP/M user.

 Uses a full intelligent terminal emulator to enable the user to run 99% of all commercially produced CP/M software with no modifications whatsoever.

 Supplied in a standard half height drive case with integral PSU and finished in the standard BBC colour.

All this and more for ONLY £350 plus VAT.

**EPROM PROGRAMMER** for BBC MICRO



At last! - the EPROM Programmer for BBC Micro Computer from WATFORD ELECTRONICS that will suit both your pocket and all your requirements. Programs all popular types of EPROMS from 2K bytes up to 16K bytes -2716 - 2516 - 2532 - 2564 - 2764 -27128.

This extremely powerful system is designed for your needs of TODAY & TOMORROW! - BBC Basic programs can be copied into EPROM and subsequently re-loaded faster than from a disc! Suitable for both hobbyist and professional users!

Just look at these features:

O COMPLETELY SELF CONTAINED -Housed in its own sturdy case - Uses its own power supply - connects directly to the 1MHz Bus - Simple and Safe!

 FULL SOFTWARE SUPPORT - Comes complete with simple to use fully machine code ROM based software and easy to understand manual, Facilities include Varification, Reading, Virgin Testing, Writing, Editing, Saving, Loading and more! NOTE!! -This software does not simply comprise hastily prepared routines to get you going, but is a professional, purpose designed applications package.

 ACORN BUS COMPATIBLE - Use of the 1MHz connection complies with all Acorn addressing recommendations - That means you can still add-on such things as the TELETEXT, IEEE 488 TUBE and PRESTEL

 Allows more than one program to reside in an EPROM using the ROM Filing System.

ONLY £89 incl. Manual (£3 carr)

#### **BEEB SPEECH** SYNTHESISER

VERSATILE SPEECH SYNTHESISER UNIT FOR THE BBC MICROCOMPUTER

Watford Electronic's very own Speech System. Specially designed so that even a novice can make his BBC talk:-

SIMPLY the best! - An unlimited speech synthesis system. Complete with easy-to-follow manual. Controlling software is in ROM so no Cassette Loading problems

PHONEMES for word synthesis - That means unlimited vocabulary! No extra speech dictionary chips to buy!

BUILT-in Library of approximately 500 words to get you started.

ENGLISH accent - Utilises inflexion techniques to produce highly comprehensible speech. EASY to use system - Just plug the software ROM into a socket, the Speech unit into

the User Port, and away you go! No specialised 'dealer upgrade' required! COMPACT unit - The whole system is built into a small case - easily tucked behind the computer. Auxillary output socket provided for direct connection to an external

amplifier. HOURS of fun! - Suitable for any application -Games, Educational Programs, Specialised Packages.

We know this all seems to good to be true but DON'T BE LEFT SPEECHLESS! Order your Versatile Speech Unit now!

Only £39

Continued -



## \* THE ULTIMATE \* BBC MICRO DFS

#### by Watford Electronics

High acclaimed at the Acorn User Show. What do the independent press say?

Good value for money – Beebug Aug. '83
A very worthwhile package – The Micro User
You'll be buying a very powerful package –
Personal Computer News
Superior DFS; Excellent disc sector editor –
Computer Answers

Without a doubt, the most sophisticated DFS Software yet written for BBC Micro Computer. This powerful new DFS is fully compatible with ACORN DFS yet has much increased power due to additions, carefully 'designed to make life easier in normal use. It consists of over 14K of efficiently written machine code. It is entirely self contained and so does not require a utilities disc to function.

\* The system can either use the ACORN standard 31 files per disc side or DOUBLE THE CAPACITY to 62 files. The size is selected at formatting time. Copying between discs with different catalogue sizes works perfectly normally.

\* A FORMATTING PROGRAM is built in, permitting formatting to 35,40,80 track formats with either 31 or 62 files. Since the formatter is built in to the DFS it can be used without affecting whatever program you are using.

\* A DISC VERIFIER is also built in. This checks the internal checksums on each sector to identify any corrupted data. This is extremely useful when saving valuable data as it shows faulty discs quickly and easily. Again it does not affect the program you are using.

\* A built in DISC SECTOR EDITOR gives a screen window onto the disc enabling detailed editing of any byte on the disc. This is very useful for recovering accidently deleted files and can save weeks of work.

\* A double step mode allows the user of 80 TRACK DRIVES TO READ 40 TRACK DISCS. This mode is software selected for each drive individually, thus allowing a 40 track disc to be copied onto an 80 track one very easily. THIS ELIMINATES THE NEED FOR EXPENSIVE SWITCHABLE DRIVES.

 A WORKFILE function sets the name to be used when the null filename is issued. This allows a program to be edited and repeatedly saved having only typed its name once.

\* When using LOAD, CHAIN, etc. it is possible to specify an ambiguous filename. This will result in the first file whose name matches the specification being used. This saves typing the end of a filename that you know is uniquely identified by its first few characters.

\* Two commands exist to simplify the transfer of programs from TAPE TO DISC. These load the file to & 1100, switch off the disc system and then move the file to its correct load address; thus saving a lot of complicated programming. This command can be used to load files up to 27K75 long.

 An advanced COPY command is included which will prompt the user, requesting whether to copy each file.

\* RENAME has been extended to allow the use of ambiguous filenames. This allows you to change BERT1, BERT2, BERT3 to FRED1, FRED2, FRED3 with only one command.

\* OPENOUT has been improved to give you fewer annoying 'Can't extend' errors, as it automatically picks the biggest space on the disc in which to put a file. A SPACE command lets you know how much space \*COMPACT could create before you waste time doing it.

\* 2K of RAM can be reclaimed from the DFS

by setting "PAGE" to & 1100.

Now with extra features:

\* The powerful library system has been extended so that libraries now work on all accesses not only \*RUN. This allows you to have a utility directory with all your commonly used programs without muddling in your current workfiles. Very useful for BCPL User. \* Programs can now reside lower in memory by reclaiming some of the DFS' workspaces, indeed PAGE can be taken as low as £1100 under most circumstances.

\* To make DFS easy to use, wild cards ("\*") have been made vastly powerful, e.g. \*INFO

Continued:

#### **BEEBFONT ROM**

BEEBFONT is a remarkable new concept in BBC software, exclusively available from Watford. Once fitted, the 16K ROM will enable you to produce attractive text displays in following different styles:

ABCDE 16 JALANOP

\* It works in modes 0, 1, 2, 4, using full colour.

★ Simply use Ctrl-V to select the font and all further screen output will be in a new style.

★ Even the ordinary Beeb character set can be enhanced by doubling height or width and emphasising to give bold print.

\* A comprehensive editor is included which enables the user to design his own characters.

★ A spooling program is provided which enables pre-formatted text files to be displayed on an Epson printer using the full range of character styles.

★ This really must be one of the most original and exciting products of the year.

★ A twenty page manual is provided and the demo/editor software comes on disc or cassette (please specify when ordering). ONLY £39

#### DISC DOCTOR

£26

A sophisticated Disc Utility ROM with many useful commands. (For detail description please refer to Computer Concept's advert in this magazine.)

#### Wordwise

Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use.

only £33

DFS continued:

\*A\* gives information on all files in the current directory which have an "A" anywhere at all in their filename.

 Comprehensive and clearly written Manual (available separately) gives the user a complete package deal.

 Fully compatible with BBC TELETEX and TORCH Systems

Complete Disc Interface Kit including DFS ROM and fitting instructions ONLY £95
Comprehensive and clearly written DFS
Manual ONLY £7.50
(P.S. This manual will only be sold to those who purchase our DFS).

P.S. We will exchange your existing ACORN
DFS or PACE (AMCOM) DFS for the highly
sophisticated Watford's DFS ROM for

ONLY £25

#### BEEBMON

The most powerful and versatile machine code monitor ROM yet written for BBC Micro. It has all the normal memory editing, moving and relocating facilities, plus all editing is with a full screen editor allowing scrolling up and down memory, entering in Hex, ASCII or standard assembler mnemonics.

In use as a debugging tool, you run code under a total emulation system. Everfelt a desperate urge to set a break point in ROM? No problem – you can even have breakpoint on reading or writing locations in memory and on register contents. The system fully supports debugging of sideways ROMs e.g. BASIC can fully and easily be run from within Beebmon and from there DFS and other sideways ROMs can be used in total amulation mode.

used in total emulation mode. Beebmon can even run itself. In so doing you can nest Beebmon up to a level limited only by the memory size. Beebmon uses 256 bytes of workspace, located anywhere in memory, even on the 1MHz Bus. Beebmon effectively uses no zero page workspace, so your program (e.g. BASIC) can use any or all of the base page. How does it achieve this? By providing a 6502 interpreter all programs running under it exist in a vertual BBC, so special memory locations like the ROM latch are not actually accessed by your programs, instead they alter a location in Beebmon's workspace. Emulation also allows immediate return to Beebmon command level by ctrl-escape no matter what code is being excuted at the time. All this exceptional power and flexibility is complemented by a clear and detailed manual included in a value for money price of:

ONLY £25

#### \* \* NEW NEW NEW \* \*

IT'S HERE!!! WATFORD'S LATEST ROM BASED SOFTWARE

DISASSEMBLER ROM
Discover the hidden secrets of BASIC and the
OPERATING SYSTEM with this easy to use

A ROM based machine code Disassembler for the BBC micro. It enables machine code programs to be listed in BASIC/DUMP format and thus is the perfect complement to the built in assembler. It allows Sideways ROMs, files on disk or tape to be listed, and also has a comprehensive editor, allowing mnemonics to be altered directly, as well as HEX, DECIMAL, ASCII and BINARY memory editing. There is also a full set of labelling facilities available (up to 3,200 labels), with the major locations and routines already labelled.

Thus DIS-ASM enables any monitor program, such as BEEBMON to be used to much greater effect as it is not necessary to disassemble memory each time the display is altered.

All these and other facilities for ONLY £16 (Price includes a comprehensive manual and fitting instructions.)

#### FORTH ROM for BBC

This superb (FIG FORTH) compiling language now available in ROM. Simply plugs into one of the ROM Sockets. Manual included. £36

TINY PASCAL (in 16K ROM)

PASCAL-T is capable of compiling source
PASCAL into a compact very fast
threaded-interpreters-code. Full editor and disc
support are included. Comprehensive
documentation supplied £59

#### VIEW

Acorn soft's Wordprocessor ROM.

£52





ACCESS ORDERS BY TELEPHONE Simply phone your orde through. We do the res

(0923) 50234/4058

#### NEW BEEB PRINTER ROM



Are you fed up with not being able to unravel your printer manual and use all those features you paid for? Need sensible paging for use in the creation of booklets? Then you certainly need our Beeb Printer ROM.

A machine code printer utility in ROM.

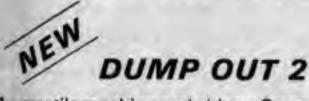
- \* 'Single' key operations replace control code sequences for underline, front and size selection, paper movement, etc. Up to 30 come pre-defined, without effecting normal fn key usage.
- \* Automatic fanfold page margins. Puts gaps in listings. PRINTed text etc to skip the folds. The gap size alternates to minimise paper wastage when using binders.
- \* Form feed and related commands, made available on ALL printers. Can also provide a left margin.
- \* User defined characters embedded within text are printed as on VDU.
- \* \* Commands select option for GP100, STAR, NEC, MX/FX, LP VII/DMP100, DMP200. Operates with parallel interface printers and is turned on by \*FX5.3.

Supplied complete with Manual.

Price: £24

(When ordering, please specify the make of printer you have.)

#### TWO NEW GRAPHICS SCREEN DUMP ROMS from WATFORD



A versatile machine code hi-res Screen Dump

- You can now have small or large 2 tone dumps and multi-tone 'colour' pattern dumps (8 distinct mode 2 shades) on every printer.
- \*Commands initiate the required dump optional parameters may be included for colour masking and selecting the part of the screen to be dumped.
- Clever use of the processor stack means that no workspace is required! (Multitone dumps also use 2 zero page locations.)
- For GP80/100/250, STAR, NEC, EPSON MX/RX/FX, LPVII, DMP100/120/200/400.
- Screen modes 0, 1, 2, 4, & 5.

Instruction Manual All this for

ONLY £15

## NEW EPSON DUMP ROM

Will accurately DUMP all Screen modes including TELETEXT, GRAPHICS and DOUBLE HEIGHT. MULTITONE DUMPS are also supported. ONLY £16

#### DISC EXECUTOR

Disc Executor is a sophisticated disc utility, designed for the BBC Micro, which allows you to transfer almost all of your tape software to disc. It will handle 'Locked' programs and allows you to load full length adventure type programs (i.e. up to &6E blocks) from disc in seconds rather than minutes.

Price: £12

#### WONDERFUL WATFORD

#### SURGE PROTECTOR Plug

Safely eliminates dangerous voltage surges. During a thunderstorm, a nearby lightning strike can induce high voltage spikes in the voltage supply or fluctuating loads can also result in transient overvoltages which if unchecked, lead to expensive data corruption/loss. Our surge protection plug will provide the necessary surge protection. Simply replace your standard 13Amp mains plug with the surge protection plug (which is almost the same size). Ideal for computers, Hi-Fi systems, precision instruments, fridge freezers, etc. Max. surge current 2KAmp; Max. Voltage 250 Volts.

Price: £8

#### **BBC JOYSTICKS**

Two versions available:

SINGLE: Player type TWO Players type

£7.00 each £11.50 per pair

#### **EDUCATION Software**

JUNIOR MATHS PACK (32K)

£6.95

Makes learning fun for 5-11 year olds. This package consists of 3 programs (menu driven) that increase in difficulty as your child becomes competent. A very good supplement to standard educational methods.

CHEMISTRY

£6.00

Make learning fun with this graded program which teaches the Atomic table including Atomic Symbols, Atomic Number and normal form using a fruit machine type display. 5

WORLD GEOGRAPHY (32K)

£7.00

Beautifully drawn Hi-Res colour map of the world illustrates and aids this graded series of tests on capital cities and populations of the world.

WORDHANG

(Age 7-13). A word guessing program based on the well known Hangman game. Uses full colour graphics. Complete with 260 words and the facility save your own list of words.

WORLDWISE

£7.80

(Age 7-15. Two constructive geography programs allowing children to build detailed data bases covering both the UK and the world. Encourages children to refer to atlas and reference books. Save the database anytime.

PHYSICS

£6.00

Displays measurements of mass, work, temperature, etc., their associated units and formulas for calculating these units. For 4th and 6th formers.

WHICH SALT

£6.00

Identify a compound from the result of a series of tests. Superb graphical animation shows what would otherwise be observed in a laboratory. For 4th and 6th formers.

HAPPY NUMBERS

£7.80

(Age 4-6). No reading skills are required to use this colour graphics number recognition and counting program. Children build patterns of flowers corresponding to figures, quickly learning their significance.

INTRO TO ARITHMETIC

£10.45

4 programs - Additions, subtractions, multiplications and divisions. Help stage, moving graphics and colours. Worksheet produced at the end of program. (5-7 years

#### PLINTH FOR BBC MICRO

Protect your micro from the weight of the heavy TV/Monitor. This sturdy plinth is attractively finished in BBC colour. It can be used to support a monitor or a printer. The micro slides underneath comfortably. A must for every BBC Micro owner, specially for those who have to move/open their computer frequently.

Price: £10 (carr. £1.50)

#### PLINTH FOR PRINTERS

Keeps your desk tidy. Place the printer on the plinth and the paper underneath. Finished in BBC colour.

£10 (carr. £1.50)

#### **VOLTMACE'S DELTA 14** Hand-set

(Highly acclaimed at the Acorn User Exhibition) Save your BBC Keyboard from a games bashing with our precision, smooth, sprung return 'Delta 14' Joysticks which has a built-in 14 Button Keypad. The hand set is Acorn Soft compatible and will work as a Joystick and two Fire buttons. Adding the ADAPTOR BOX will enable the use of all twelve Buttons (plus two repeated).

A user friendly, Keyboard to Keypad transfer program allows you to assign any Keyboard Key to either Keypad button or Joystick direction. The program also allows you to adjust sensitivity on the Joystick and conversions can be saved in a library which already contains some Acorn-Soft conver-

Price: 'Delta 14' Hand set ADAPTOR MODULE TRANSFER PROGRAM

£12.50 £11.95 Tape £5.15 Disc £7.75



#### ATTACHE CARRYING CASE for BBC Micro

These Attache Carrying cases are attractively finished in mottled antique brown leatherette. An ideal and very safe way to carry your BBC Microcomputer. Price: £10 (£2 carr.)

RESERVED

This space is reserved for the launch of yet another ROM based Software for BBC Micro.

For details please read our advert next month.

#### **EPROM Programming** Service

New from Watford, a service to the writer of Sideways ROMs for the BBC Micro or any other ROMs. Send us your ROM dump on BBC format disc, 40 or 80 track stating the type of EPROM required. We will program for you 2516, 2716 (single rail), 2532, 2564, 2764 or 27128. (You may send your own blank EPROMs or purchase them from us).

Programming service charge £8

WATFORD **ELECTRONICS** 

Continued —

#### **GEMINI'S BUSINESS SOFTWARE**

Cashbook Accounts	£52
Final Accounts	£52
Invoices & Statements	£17.25
Commercial Accounts	£17.25
Mailing List	£17.25
Database	£17.25
Stock Control	£17.25
Home Accounts	£17.25
Beebcalc Spreadsheet Analysis	£17.25
Beebplot	£17.25
Payroll	£39

N.B. All the above Gemini software is on tape. For Disc Based (40/80 track) please add £3.

BOOKS (No VAT on Books)
30 Programs – BBC Micro£4.95
30 Hour BASIC (BBC Micro) £6.00
35 Educational Programs for BBC . £6.95
36 Challenging Games for BBC £5.95
100 Programs for BBC Micro£6.95
Cassette version of above£10
6502 Application Book£10.25
6502 Assembly Lang Prog £12.50
6502 Assembly Lang.
Subroutines£11.80
6502 Software Design£10.50
A young persons guide to BBC Basic£4.50
ACORN ATOM Magic Book£5.50
Advanced User Guide for
BBC Micro £12.85
Advanced 6502 Interfacing £10.95
Advanced 6502 Programming£10.50
Assembly Lang. Programming
for BBC£8.95
Advanced Programming Techniques for the
BBC Micro£7.95
BBC Basic£7.95
Assembly Lang. Prog. on BBC £7.40
BBC Forth £7.50
BBC Lisp £7.50
BBC Micro An Expert Guide £6.95
Easyprogramming for BBC Micro £5.95
BBC Micro Graphics and Sound £6.95
BBC Micro ROM PAGING System
Explained£2.95
BBC Micro Revealed£7.95
BBC Micro Instant Machine Code
including Software Cassette £34.00
BBC Micro Assembly Lang. Prog £7.95
BBC Micro Disc Companion £7.95
DBC Micro in Education
BBC Micro in Education£6.50
Basic Programming on BBC Micro £5.95
Creating Adventure Programs
on BBC Micros£6.95
Creative Graphics Cassette (Acornsoft). Has
36 graphics programs£8.95
Creative Graphics on BBC Micro £7.50
Complete Programmer for BBC£5.95
Discover BBC Machine Code £6.95
Discover FORTH - Osborne £11.25
Easy Prog. for BBC Micro£6.50
Further Prog. for BBC Micro £6.90
FORTH Programming (Sams) £12.50
Functional Forth for the BBC Micro £5.95
Games on your BBC Micro£2.95
Games BBC Computer can Play £6.95
Getting Acquainted/Acorn ATOM £7.95
Graphs & Charts on BBC Micro £7.50
Intro to Micro Beginners Book
(3 Ed.)£9.90
Graphic Art for BBC Computer £5.95
Graphs and Charts (Cassette) £8.95
Graphics on BBC Micro £6.95
Introducing the BBC Micro FE QE
Introducing the BBC Micro£5.95
LISP
LISP£9.25 Logo Programming£8.95
Mastering VISICALC (Sybex) £11.95
Micros in the Classroom£4.90
Practical Prog. for BBC & ATOM £5.95
Programming the 6502 £10.75
Programming the BBC Micro£6.95
PASCAL£9.25
Programing for Education on BBC £5.95
Structured Prog. with BBC BASIC £9.50
The BBC Mises Back BACK COUNTRY
The BBC Micro Book, BASIC, SOUND &
GRAPHICS£7.40
Using Floppy Discs with BBC
Micro £5.95
Using BBC Basic £6.95

#### **NEW LAUNCH**

#### \* PENGO \*

One of the most sophisticated full colour, 100% machine code games software. This arcade game will give hours of fun. You (Pengo) are being harassed by the devouring Snobees (Snow Beasties) whose diet is the Ice-cubes and an occasional juicy Pengo!! Your only means of survival is to hurl the ice-cubes at the marauding snobees and crush them into the snow. Beware, as you crush them to death the remaining snobees turn even more vicious. Each act will bring a new species, even more agressive!!! All is not lost; Bonus points are won by lining up the three indestructable DIAMOND cubes. Progressive levels of difficulty. Bonus Pengo at 30K points. A MUST for all BBC Micro owners.

Only: £7.75

#### CRAWLER

A new challenge for your reflexes, exercise your fingers. Crawler is the best yet BBC version of the game popularised in the arcades as "CENTIPEDE". Blast the voracious caterpillar before it eats you. Avoid the wandering spiders. Shoot the scorpions before they poison the mushrooms. Kill the descending fleas as they caurse massive mushroom growth. This game is a delight to play, the controls are responsive and fast yet precise. All this for ONLY £6.95

#### **GAMES SOFTWARE** (PROGRAM POWER)

CHESS	£6.95
CROACKER	£6.95
Escape from MOONBASE ALPHA	£6.95
FELIX in the FACTORY	£6.95
GALACTIC COMMANDER	£6.95
KILLER GORILLA	£6.95
MUNCHYMAN	£5.95
MOONRAIDER	£6.95
PENGO (Watford)	£7.75
SWOOP	£6.95
747 FLIGHT SIMULATOR	£7.75

#### **LEVEL 9 ADVENTURE GAMES**

COLOSSAL ADVENTURE. The classical mainframe game "Adventure" with all the original puzzles plus 70 extra rooms. £8.65

ADVENTURE QUEST. Through forest, mountains, desert, caves, water, fire, moorland and swamp on an epic quest vs tyranny. £8.50

DUNGEON ADVENTURE. Over 100 puzzles in the Demon Lord's dungeons.

£8.50 SNOWBALL. Save a 7000 location colony starship in 2302 AD.

#### SEIKOSHA GP250X:

10" Tractor Feed, 80 columns, 60 CPS, normal and double - width/height characters, 128 characters with true descenders in ROM, 64 user definable characters in RAM (384 bytes) Programmed printing (80 bytes of memory) for storing your own print sequences, dot addressable graphics with repetitive graphics data printing, RS232 and Centronics parallel interfaces standard, paper empty function and buzzer, self test routine. All this for

ONLY £199 (£7 carr.)

#### **ACCESS ORDERS**

Simply phone your order through and we will do the rest. Tel: (0923) 50234

> WATFORD - Always a step ahead

#### SPECIAL 'DISC DRIVE ISSUE' OFFER

MITSUBISHI DISC DRIVES

Cased, including Power Cable and Interface Cable. Plugs directly to BBC's Power Supply socket.

LCS400 Single 400K Drive LCD800 Twin 800K Drives

£188 £369

#### **BBC FORTH** on Cassette

Follows FORTH-79 standard and has fig-Forth facilities - Provides 260 FORTH words infinitely extensible - Full screen editor -Allows full use of MOS - Permits use of all graphic modes, even 0-2 (just) - Easy recurtion - Runs faster than BBC BASIC. ONLY £15 FREE 70 page manual and a Summary card.

#### **BBC FORTH TOOLKIT**

Adds following facilities to FORTH, 6502 Assembler, providing machine-code within FORTH - Turtle graphics enables easy to use colour graphics - Decompiler routines enables versatile examination of your compiled FORTH programs - Full double number set - An example FORTH program and graphics demonstration - Other useful routines - 64 page manual included FREE ONLY £13

#### LOGO II

This language is very popular in American schools as it is an ideal educational program. It can graphically demonstrate the ideas of defined procedures, sub-routines, loops and even recursive programming. Gives excellent introduction to LOGO language for young and old alike.

£9.95

#### TEX EPROM ERASERS

New Broom for EPROMS

EPROMs need careful treatment to survive their expected lifetime. Rushing it could burn their brains out. So cop-out of this helter-skelter world; take it easy the TEX way and give your chips a well earned break. Cool, gentle and affordable. EPROMPT does it properly.

Two versions available:

EPROMPT EB – The standard version.

Erases up to 16 chips. £30.00

 EPROMPT GT - Erases up to 32 chips. Has an incorporated safety switch which automatically switches off the UV lamp when the Eraser is opened. £35.00.

We stock a wide selection of games software and peripherals for BBC Micro. Why not call in at our shop for a demonstration. Be satisfied before you buy.

Prices subject to change without notice.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED. CARRIAGE: Unless stated otherwise, please add 60p to all cash orders.

VAT: UK customers please add 15% VAT to the total cost incl. Carriage.

£8.50

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces) ACCESS ORDERS: Simply phone: Watford (0923) 50234. (24 Hours)



Dept. BBC, Cardiff Road, Watford, Herts, England. Telephone: 0923 40588/37774. Telex: 8956095

# IAN MURRAY takes an in-depth look at pitfalls facing the programmer writing educational software

PUT yourself in the mind of a 10-year-old youngster. Sorry you are a 10-year-old youngster... hop along now and fetch your mum or dad!

Good. Make certain Susan or Mike are not peeping over your shoulder. Now we can pretend what it must be like to sit in front of the screen at an age when being a teenager is like being grown-up.

There are zaps, whams and pows. You press keys and – wow! the machine obeys you.

The rocket takes off. Another key is pressed and the screen changes colour. It's wonderful.

For the first time in your short life, you are the boss and completely in control.

The machine doesn't shout at you. Mum and dad think you're great – well you haven't emptied the kitchen sink over the floor. And it's fun! The problem for the writers of educational software is that youngsters love to experiment. Even with those simple (and dreadful) addition programs.

You are asked to choose two numbers. The first time you obey the instructions and choose two reasonable numbers.

The next time you choose two very large numbers – lots of noughts in them. The answer miraculously appears – or does it?

Type in:

#### PRINT 1234567890 + 345600000000

The answer: 3.46834568E11 appears.

Horror! The machine is faulty. The youngster rushes into the garden to tell dad that his computer must go straight back to the shop.

We know that the answer is in exponential format because the machine

cannot handle very large integers. But your excited youngster doesn't.

The desire to experiment with the extremes of the machine can cause yet further havoc.

The screen display may collapse or be insufficient for the answer – despite the answer being correct. Type in the following and see what happens:

10 CLS

20 VDU 28,10,20,16,19

30 INPUT A

40 INPUT B

50 PRINT A+B

Run the program with two sensible numbers – like 23 and 47. The result of 70 appears. Now run the program with 3456 and 1234567. The answer you see is 023. This is correct?

What has happened is that the VDU 28 is the command for defining a text window, and the window is not large enough for the whole answer.

This may be a trivial example – but I have seen it several times in educational software.

Alternatively, if the screen display collapses it often is impossible to get it back without reloading the software completely.

The youngster gets quickly fed up. An otherwise good piece of work lies unused because the programmer did not think like a child.

A young person will go to extraordinary lengths to experiment – not with the lesson, but with the software teaching the lesson.

The job of structuring and limiting the range of possible replies by the youngster is called validation. Good validation is the secret to good software.

Bad validation either gives us £00.00 in our wage slip or a gas bill for £200,000.00 when we have been on holiday for two weeks.

The object of validation is not only to make software robust, but also to direct the learning of the student.

Look back at the trivial addition example above. You may not want the youngster to discover that there is a valid method of writing numbers which includes the letter 'E'.

It may lead to running before walking or even the young person being frightened off numbers by concepts which are beyond their stage of development.

Your validation will therefore include, not only length of input checks



#### From Page 47

and number range of answer checks, but also character checks to see that the correct type of keyboard character has been used.

As all validation is expensive on memory, you will need to develop general purpose procedures to perform the checks – and an example is given below.

Note, however, that in the BBC Micro there is a conflict between the amount of memory space given over to clever program ideas – and validation of those ideas – particularly in higher screen modes.

You have to decide whether the last screen shape is worth the possibility of the program crashing.

My general view is that with younger children - the program must not crash.

Listing I, deliberately overdocumented, shows the kind of validation routine you will need.

If you specify on entry to the function the highest and lowest letters acceptable and how many you will allow the routine will input routine to those specifications (see listing below).

As it stands this is a little limited. You may accept any length up to a certain number of characters.

Then you would have to alter line 310 to just catching the Return key.

You may decide to allow capitals and small letters. You would then need a line 215 such as:

#### IF Entry > High THEN Entry = Entry - 32

This spots an Ascii character larger than Z and brings the Ascii character back down to capitals for processing purposes.

All data entry, once you have limited the number of characters to be entered, should be done via a screen window.

The screen window must be large enough to take the width of the data entry and deep enough to accommodate any error messages.

If you do this, you can keep on the screen any clever graphics, which is entertaining to the viewer without the cumbersome use of PRINT TABs to position your data entry.

You can happily clear the text window without worrying about the rest of the display.

Disc fault 18 at 00/50.

I had this error message while writing this article. It is totally uninformative, useless and encourages grown adults to tear their hair out in frenzy.

The younger generation may be more self-controlled about the hi-tech world, but useless error messages ruin software.

Youngsters are always going to examine your software and drive it to the limits. Expect it. Gently inform them that you've sussed this and they won't get away with it.

DO NOT use this as an error message:

Number out of range - try again or:

Not valid

or worse - simply repeat the input question mark.

On data entry, you should always specify to the user what the expected range of numbers/letters is:

I like a WHOLE number from 1 to 100.

What is your number?

If then the prankster types in 999, he has done it because:

- It's a genuine error so repeat instructions.
- He's misread so use simpler language.
- It's deliberate over-play so inform the user we know the prank.

Your number is no good.

Try a WHOLE number from 1 to 100. Type in again?

Error messages occupy large

amounts of memory space and are tedious to type in. So store bits of the message in string variables.

For instance:

LET Error1\$ = "Your number is" LET Error2\$ = "Type in again?" LET Error3\$ = "Try a WHOLE number"

You then make your error messages combinations of pre-planned error messages. You will be surprised just how much memory and typing this saves. Make certain they will all fit inside the text window!

A full description on program assistance will be given in next month's The Micro User.

But you should always know when the user is likely to forget part of a data entry.

Science teachers scream blue murder if we leave the units off our experiments and calculations.

"Three whats!?", they howl. "Miles - biscuit tins what?"

I have noticed that most software is equally bad.

The worst asks you to type in a distance – no idea of units.

The moderately bad asks you to type in your distance in miles – but then does not expect the user to specify any units.

You have to decide whether any units are necessary - not just to run the program, but as a learning point.

There is a good example of excellent user assistance in London's Smile maths software.

How good are you at coordinates? Do you always remember the brackets round the number (6,3)

No? Why not!

330 =Temp\$

The Smile maths software puts the brackets on the screen before data entry and the numbers must be fitted inside the brackets.

Very good! You see (,) and your

10 CLS
20 A\$=FNinput("Z","A",6)
30 PRINT A\$
40 END
100 DEF FNinput(High\$,Low\$,Num)
110 LOCAL High,Low,Counter,Entry
,Delete
120 LOCAL Return,Temp\$,Entry\$
130 LET Delete=127
: LET Return=13
140 LET High=ASC (High\$)
: LET Low=ASC (Low\$)
150 LET counter=0

160 REPEAT

170 REPEAT

180 REPEAT

190 Ok=FALSE

200 LET Entry\$=GET\$

210 Entry=ASC (Entry\$)

220 IF Entry >= Low AND Entry (= High THEN Ok = TRUE

230 UNTIL (Counter = O AND Entry

(> Delete) OR Counter ( Num
OR (Counter = Num AND NOT Ok)

240 UNTIL Ok OR Entry = Delete
OR Entry =Return

250 LET Counter=Counter+1
260 IF Entry=Delete
THEN Counter=Counter-2
270 IF Entry=Return
THEN Counter=Counter-1
280 LET Temp\$=Temp\$+Entry\$
290 LET Temp\$=LEFT\$(Temp\$,Counter)
300 IF Entry()Return
THEN PRINT Entry\$;
310 UNTIL (Num=Counter AND Entry=Return)
320 PRINT

Listing I

# BREATHTAKING IMAGES FROM DISC OR CASSETTE



# BREATHTAKING IMAGES FROM DISC OR CASSETTE



# -SPOT THE DIFFERENCE

Happily for prospective purchasers of the Microvitec CUB RGB/PAL colour monitor there is no difference.

This superb machine produces brilliant pin-sharp images when used with a micro computer, thanks to a screen resolution of 585 pixels by 452, plus a bandwidth in excess of 15MHz. Yet the RGB/PAL also gives the highest quality pictures from laser discs, V.C.R.'s and video cameras. This is because the signal is not

modulated and then remodulated, as happens with an ordinary T.V. set.

Add to this an audio facility and the result is a colour monitor which sounds as good as it looks.

Finally, perhaps the best news for

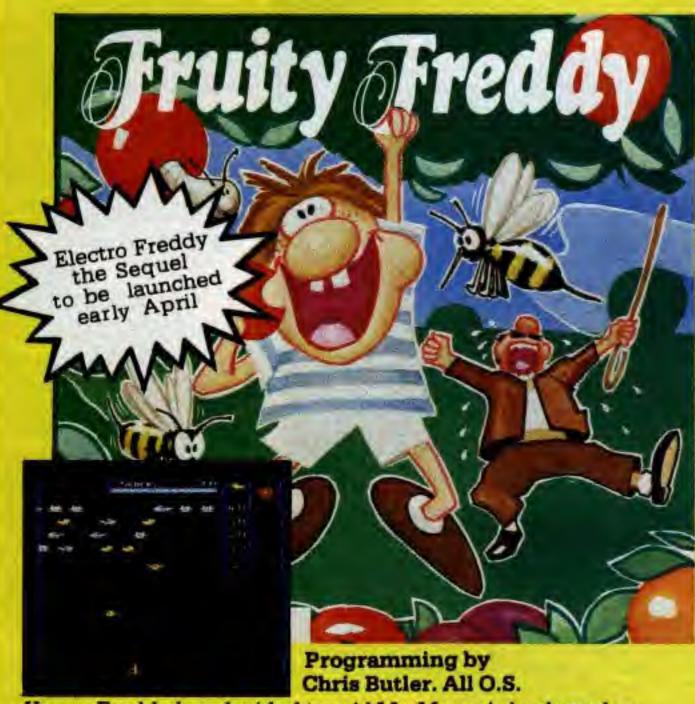
COLOUR DISPLAYS

purchasers is that the CUB colour monitor represents a real investment. However dramatically computers or video systems may change in the coming years the means of displaying their output is unlikely to alter – you can't improve on the best.

Find out just how inexpensive quality can be by calling at your local computer dealer. Alternatively, contact Microvitec direct for full details of the breathtaking range of CUB colour monitors.

Microvitec Ltd., Futures Way, Bolling Road, Bradford BD4 7TU. Tel: (0274) 390011. Telex: 517717

## ENTER THE SOFTSPOT AMUSEMENT ARGADE...



Young Freddy has decided to raid Mr. Meano's back garden, collecting the growing fruit before they run to seed. Tread on the fruit before they're ripe and Mr. Meano will be after you. Avoid the pesky bees or kill them with the can of DDT. Look out for the Crazy Crimson Catapillar and the sparrow with its deadly droppings, but grab the sweets, drinks and other goodies. Can you make Freddy's perilous task fruitful? Smooth multi-coloured graphics and all arcade standard features make this a most enjoyable machine code game.



All the fun and thrills of the funfair are brought to life in your BBC Computer as you fire at the targets that can fly down and eat your limited supply of bullets. Hit the bell with the slider to prevent more targets appearing. Amusing graphics and realistic sound effects make this another 100% machine code winner from Softspot.



"Look out investors your local bank is being robbed!" Manoeuvre the bank manager around the building, collecting money bags and returning them to the vault — Dodge the ever chasing robbers or bop them on the head with a hammer. Beware of the time bomb which you must defuse or you will sprout wings and fly to heaven.

Enjoy a refreshing cup of tea for bonus points, game increases

with difficulty on each level.
Features include fast smooth
multicoloured characters,
excellent sound effects, background
music. Very addictive and fun.



Your BBC Micro is under attack! The components on the circuit board are attacking the CPU. Can you stave off the many marauders by firing pulses of electricity along the data lines of the 6502. Beware of the deadly mains spikes zipping along the tracks and hit the tools on the edge of the circuit for bonus points. For emergencies only the ZAP button will destroy everything with an explosion of debris.

ALL PROGRAMS RUN ON ALL CURRENT O.S. AND BASICS ALL TAPES GUARANTEED

PRICES: Disk
Cassette £10.45each
£7.95each All prices inclusive



29 SOUTH CRESCENT PRITTLEWELL SOUTHEND

#### From Page 48

first numbers enters to the left of the comma and the second to the right. To program this is easy - it just requires thought.

The £ sign is a constant problem. It can easily be catered for by typing:

#### PRINT "£";FNinput("0","9",4)

Then the user is in no doubt about what is required. There is always a conflict here between teaching and being too supportive.

With the brackets a happy compromise would be to generate the brackets from the program if the user had not done so within a specified period of time.

The INKEY command will help you here. A little teaching reminder about brackets would not go amiss when the user is late with the brackets - and then on with the software.

Mum gives Jonathan his computer for a birthday. Within weeks he settles down. She buys him educational software.

Before very long she's telling the neighbours: "He's so fast - he's learnt so much. He gets all the sums right".

Marge rushes straight off to buy her Sarah a BBC Micro hoping that the same brilliance will attack her youngster.

It does - well not really. Jonathan and Sarah have learnt the software - not the lesson.

Take those dreadful speed addition programs. The youngsters, as you watch them, hardly wait for the sums on the screen before they type in the answers.

Basically they are tackling the additions in the same way that Snapper or Frogger are played. They have spotted the "pattern" that makes the program work.

When you put fixed data into your programs, this will always happen. In some cases you cannot avoid fixed data, such as names of places and objects.

But where you can you should always try to use the random number generator in Basic to generate a sample of data.

It is an awful waste of the programmer's time and your money, when you purchase a very pretty program which the youngsters can learn to do in five minutes.

This is the case with the BP Oil Slick program.

It is an environmental studies game, but the youngsters learn which way to disperse the slick by working out how to beat the program.

I have found that they end up with little understanding of the problems of pollution - which is a pity - unless they are restricted as to the number of times they can play.

With more random data this might not have happened. It also explains why the graphics programs are so good, because here the user selects the data for the graphics, using the computer as a tool.

This should give you some idea of the pitfalls facing the programmer writing educational software.

In next month's article I shall be discussing how to entertain the user.

The extended facilities of the BBC Micro allow us programmers a lot of scope for keeping the attention of the user.

Suffice it to say that a good monster can do wonders for a banal program.

### ADS THE ULTIMATE IN PERIPHERALS FOR THE SPECTRUM, JUPITER ACE & BBC MICROCOMPUTERS

"Highest quality peripherals at the lowest possible prices" — that's the philosophy at Advanced Digital Systems. Our team of highly experienced designers use the very latest techniques to produce adaptable home computer peripherals — at a price you can afford.

 Boards are designed using CADCAM, giving a neat optimum layout.

· Gold plated connectors are used, wherever possible, to ensure good electrical contact.

 All products carry a 12 month guarantee. · All units are "Plug in and go".

**PRINTER INTERFACE 1** Centronics Interface for the Sinclair Spectrum. £34.50 inc. VAT. Comes complete with approx 1 metre of cable, centronics plug and software.

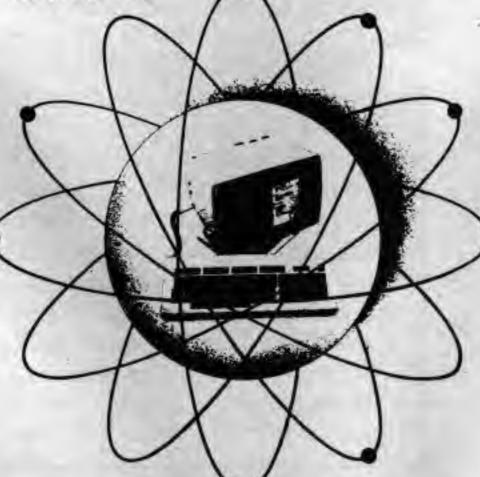
 Software recognises LLIST and LPRINT enabling Print-outs direct from Basic. Also adaptable COPY routine for graphics printers.

**PRINTER INTERFACE 2** Centronics Interface for Jupiter Ace. £39.95 including VAT and Software. Same unit as the Spectrum Interface but with

PERIPHERAL INTERFACE 3 — ZX ACE Package Using the adapter card and the Software supplied, the Sinclair ZX Printer can be connected to the Jupiter Ace. Special Introductory Offer £9.95 inc VAT.

adapter card.

PERIPHERAL INTENTAGE ... VAT. ZX BBC Adapter £24.95 inc. VAT. Enables the connection of Sinclair Peripherals to the BBC Model B. First Software package included gives an amazingly cheap entry into printing on the BBC model B by allowing you to use the ZX Printer - ideal for listings. Please allow 28 days for delivery. Unit requires 1.2 Amp power supply: either the ZX P.S.U. or the equivalent available from us at £5.95 inc. VAT.



Advanced Digital MANUFACTURERS AND DESIGNERS OF MICROCOMPUTER PERIPHERALS
9 Bonchurch Road, PORTSMOUTH, Hampshire PO4 8RY, Telephone (0705) 823825.

Systems Ltd. For International Enquiries (0705) 754160. Prestel Account No. 705-823825 MANUFACTURERS AND DESIGNERS OF

NTERSPRINTERSPRINT

Advanced Digital Systems are now able to supply the following range of printers at amazing prices.

EPSON •FX80 — £400 •RX80 - £278 • RX 80 FT - £306 •MX 100/3 — £453 •FX 100 — £532 • TRACTOR FEED

 MX 80 T/3 — P.O.A. SEIKOSHA • GP 100 A - £197

MECHANISM FOR THE FX 80 - PO.A. TEC BUSINESS

 GP 100 VC — £206 PRINTERS -•GP250X — £246 POA. GP 700 A (colour printer) — £399

MANNESMAN • MT 80 with Parallel Interface £270 • MT 80 with Serial Interface £312

Prices include VAT

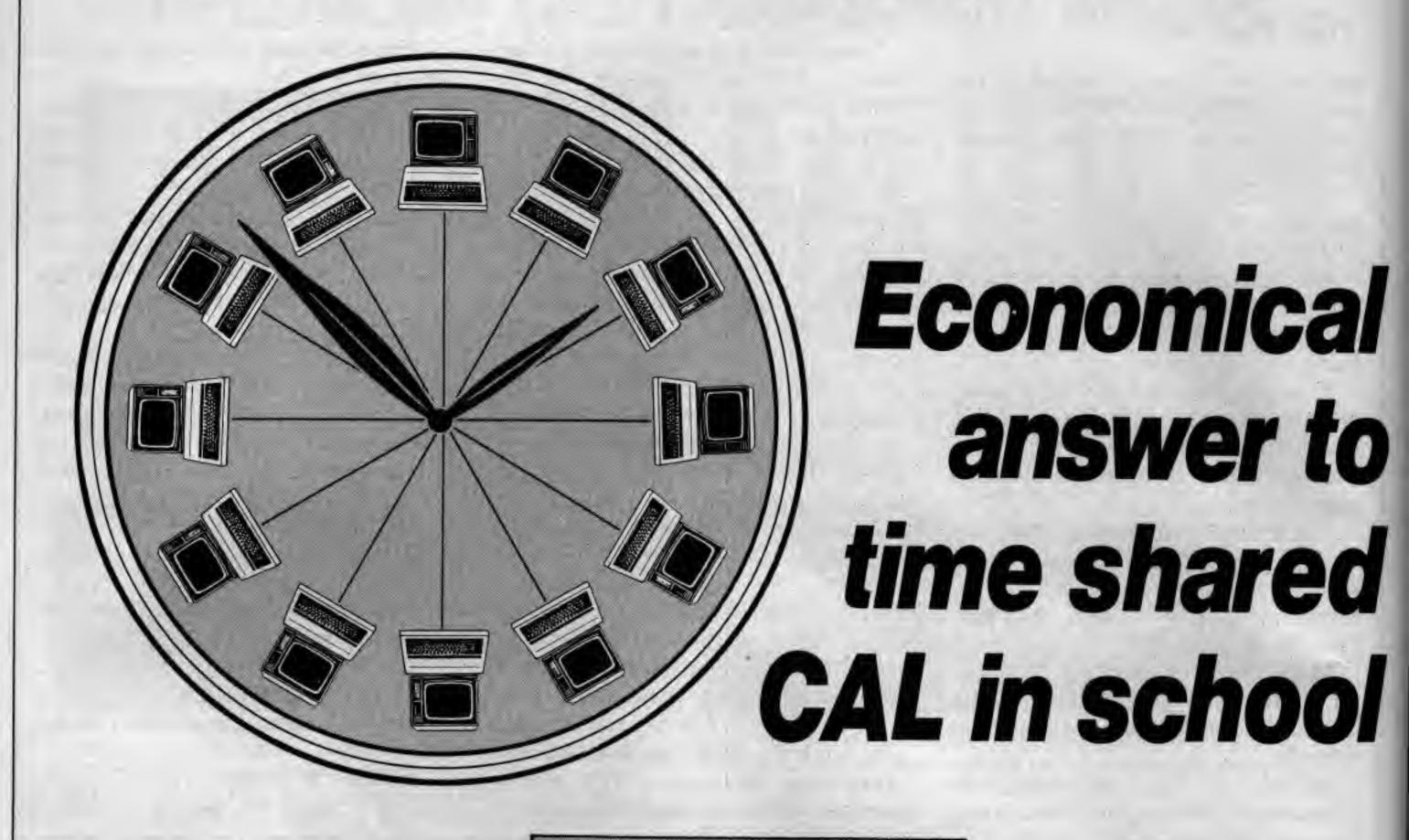
Please send me the items as ticked. Cheques payable to Advanced Digital Systems Ltd. Centronics Base Unit for Sinclair Spectrum £34.50 Inc. VAT & Software Jupiter Ace Version Base Unit and Adaptor £39.95 Inc. VAT & Software ZX Ace Adaptor and Software £9.95 Inc. VAT 1.2 Amp P.S.U. £5.95 inc. VAT

ZX BBC Adapter Unit £	24.95	inc. vai and Software	- 1-
EPSON FX 80 — £400 RX 80 — £278 RX 80 FT — £306		SEIKOSHA GP 100 A — £197 GP100 VC — £206 GP 250 X — £246	
		GP 700 A (colour printer)  — £399  Parallel Interface £270  Serial Interface £312	000

PHINTERS — Inc. VAI & Delivery

Name Address

Send order to ADVANCED DIGITAL SYSTEMS LTD. 9 Bonchurch Road, Portsmouth, Hampshire PO4 8RY.



#### By TONY CRAVEN

WE had a problem with our computers. How do you organise the use of ten BBC Micros in a sixth form college so as to give everyone as much time as you possibly can?

Some students knew more than any teacher, some had never seen a keyboard before.

Nine computers were tape based, one was a disc machine with a single sided 100k drive. The timetable demanded 40 minute slots.

We had a reasonable software library, something for everyone. Computer Studies groups were forever writing programs and wanting them saved until the following day, when they would drop in at lunchtime with 20 minutes to spare.

And those cheap tape recorders! Would they work reliably? You tell me!

I had to do something to sort out the fights for who got the disc machine. Fortunately, while browsing through the User Guide one day I came across the FX calls which direct data to the RS423 port, that middle DIN socket on the back of the BBC Micro.

Paul Beverley's article in the October edition of The Micro User about wiring

up the RS port helped greatly, and within a couple of days we had a simple network running where each of the nine TFS (tape filing system) machines were loading from and saving to the one DFS micro.

Not very fast, but at 10k in about 10 seconds who is grumbling?

Now we don't use tape recorders at all. Students can save a program at the

very end of a class, confident that it will be there tomorrow, when they can pop in with that quick amendment.

Classes can book the computer room for 40 minutes knowing that 39 of those minutes can actually be spent using the Computer Assisted Learning programs.

All for the price of a few five pin Domino DIN plugs, a multi wafer rotary selector switch and some scrap

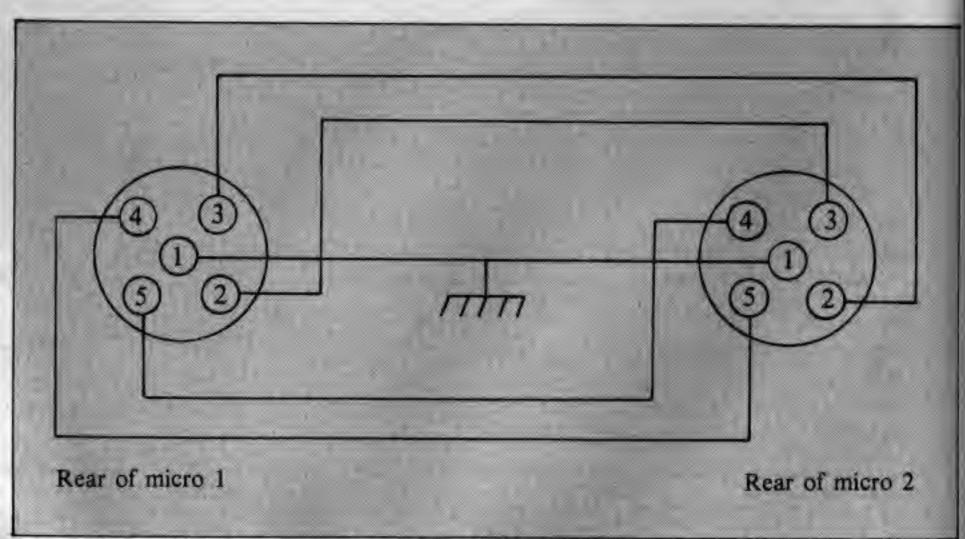


Figure I: Connections between two BBC RS 423 ports

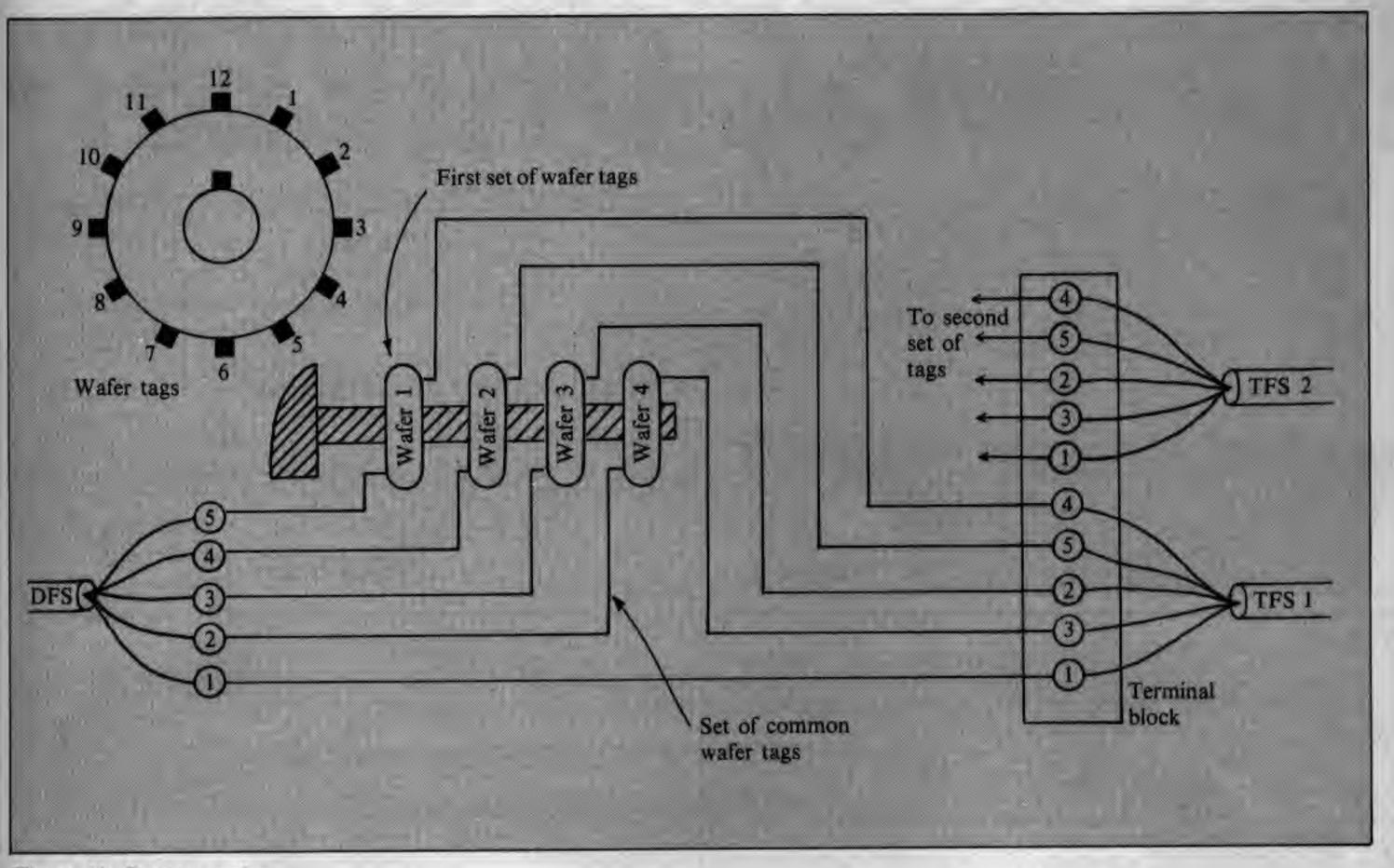


Figure II: Rotary wafer

five core cable that fell off the back of a telephone engineer's lorry.

Figure I shows the wiring necessary from the DFS micro to any number of TFS machines. I took the wires through a 12 position, four way selector switch, as shown in Figure II.

The software is very simple being contained in function keys. Each disc contains the program given in Listing I.

This program is CHAINed into the disc micro and then each TFS micro must be forced to listen to its RS port by typing in \*FX2,1 followed by Return.

The particular TFS machine is selected on the rotary switch and f9 on the DFS is pressed.

This configures the function keys on the TFS machine so that f0 makes it listen to the network and f1 transmits its current program listing to the DFS, provided the DFS has been forced to listen by having its f0 pressed.

This configuration need only be done at the beginning of each day. After that single function key presses will suffice.

The students have taken to the system very easily. All they need to do is to place the right disc in the drive, select their micro number on the rotary

switch, press f1 on their micro, f0 on the disc machine and they're off.

Saving is an equally easy process, and we have one disc dedicated per group. Everybody in that group saves their work one after the other on the same disc.

I have recently also found that simple Wordwise files can be sent over this network.

Providing there are no embedded commands in the document, \*FX5,2 typed into the transmitting computer in the menu mode, \*FX2,1 entered into the receiving computer followed by Escape, and then option six from the menu of the transmitter will dump the formatted document from one to the other.

Here the RS port is being selected as the printer for the transmitter – the receiver simply thinks that the document is being typed in, very quickly.

The receiver is locked onto its RS port and so has to be unlocked by pressing the Break key. The text can be recovered by answering Y to the old/new text prompt that occurs after a Wordwise break.

If you have more than three BBC Micros with one DFS, then rigging up

this network is well worth doing.

The hands-on time is increased dramatically and it is also really viable to have a fast change over for CAL groups.

I know that Econet can knock this network into a cocked hat, but this one costs virtually nothing. What's more, it works now.

10\*KEY0\*FX3,7!ML.!MP, "\*FX2,0"!M\*
FX3,4!M

20\*KEY1\*FX2,1!M

30\*KEY9\*FX3,7!ML.!MP, "RUN"!MP."\*
FX2,0"!M\*FX3,4!M

f0 = transmit current listing
f1 = listen to RS423 port
f9 = configure the function keys
on the TFS that has been forced
to listen.

#### Listing I

By the way, ignore any syntax error reports. It works!

Tony Craven is Microelectronics Coordinator at Shena Simon College, Manchester.

# EI80: A RECORD FOR DISCIDRIVES?

Opus are able to offer a limited quantity of 54" Slimline Double Sided 40 Track Drives. Formatted single density 200K., double density 400K.

And record value at only £179.95 and that includes everything-VAT, carriage, all necessary leads and a 12 month guarantee. You can order by post (see coupon below) or direct at our showroom.



#### OPUS 3" MICRODRIVE. Also available from W.H. Smith

Double Sided 40 Track Drive 1/2 Megabyte Unformatted.

- Twice the capacity on line of other available drives
- 200K. Single Density—400K. Double Density
- · Ex-stock delivery
- 3 ms. access time
- Lowest power consumption—direct drive
- Includes case, leads and utilities disc
- Totally compatible with 5¼" drives

Single Drive &229.95. Dual Drive £459.95.

5¼" JAPANESE DISC DRIVES.

SINGLE DRIVE. 5401, 5402 available from Spectrum Opus 5401 Single Sided 40 Track - 250K. Unformatted. Formatted: 100K. Single Density, 200K. Double Density\_ £179.95

Opus 5402 Double Sided 40 Track - 500K. Unformatted.Formatted:200K.SingleDensity. 400K. Double Density\_ £229.95 Opus 5802 Double Sided 80 Track - 1 Megabyte Unformatted. Formatted: 400K. Single Density, 800K. Double Density\_ £299.95

Switchable 80/40 Track.

 ½Height • Includes case, leads and utilities disc • Fast access time • State of the Art Technology

Ex-stock delivery
 Low power consumption



All Dual Drives are metal cased with separate power supply.

Opus Dual 5401D. Single Sided 40 Track. 200K./400K. on line\_ £379.50

Opus Dual 5402D, Doubled Sided 40 Track. 400K./800K. on line\_ £459.95

Opus Dual 5802D. Double Sided 80 Track. 800K./1.6 Megabyte on line\_ £599.95

#### DDINTTED

Opus

EPSON FX 80 F/T	£410
EPSON FX 100	£549
EPSON RX 80 F/T	£315
JUKI 6100 Daisywheel	\$435
Parallel printer leads to BBC.	£12

MONITORS.		
12" Green Screen		£89.95
12" Amber Screen		£99.95
Lead to connect to BBC	Micro	£3.95
•Ex-stock delivery	• 24 MHz Bandwidth	<ul> <li>Limited quantity</li> </ul>
14" JVC Colour Monitor-	-Med. Res	£187.39
14" JVC Colour Monitor-	-High Res	\$279.39

#### THE ORGANISER DESK.

- Top shelf for Monitor/Printer
- Large DeskTop Area
- Lower Shelf for Paper/Book Storage
- Teak Finish
- On Castors
- Self Assembly
- Ample room in front of the shelf for you to sit comfortably. Only £59.95

#### FLOPPY DISCS.

3" Cartridges £5.75 each or £25.95 for 5.

5¼" Discs—with full 5 year warranty + free plastic library case.

S/SS/D £19.95 for 10 S/S D/D &23.95 for 10

D/S D/D &26.95 for 10

S/S 80 Track **£29.00** for 10 D/S 80 Track £31.95 for 10

8" Discs.

S/SS/D £21.50.

S/SD/D £28.50.

D/SD/D £29.95.

Double Density disc filing system for BBC Micro

£99.95

#### GOVERNMENT & EDUCATION DISCOUNTS GIVEN. QUANTITY DISCOUNTS GIVEN. DEALER ENQUIRIES INVITED. OPUS SUPPLIES LTD.

158 Camberwell Road, London SE5 0EE.

Opening hours: 9.00-6.00 Monday-Friday, 01-701 8668 9.00-1.30 p.m. Saturday. 01-703 6155

#### STOP PRESS.

Address.

Phone us for latest dealer price list.

#### ALL ITEMS ARE GUARANTEED FOR 12 MONTHS AND ARE SUITABLE FOR USE WITH BBC AND OTHER LEADING MICROS.

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Please rush me the following: (ALL PRICES INCLUDE VAT & CARRIAGE.)

Quantity	Description		Price
	*		
		-501	
enclose a chec		TOTAL.	
he amount of &	my credit card account with , laycard (please tick) No. is		

Name.

Telephone.

The chips are - and you can WIN down eight of them, plus the latest ROMboard

WIN £300 worth of ROM based software and the ROMboard to put them on in this month's easy to enter competition.

The lucky winner of the competition will receive the following eight ROMs:

- A. Beeb Printer ROM the machine code printer utility.
- B. Wordwise the incredibly successful word processor from Computer Concepts.
- C. Disc Doctor the sophisticated disc utility ROM.
- D. Beebfont the ROM that allows you to define your own character sets and print them out on an Epson printer.
- E. Beebmon the ROM based machine

code monitor which allows assembly language programs to be debugged

ECTRONII

13 ROM BOARD

FOR BBC MICHO\_

and altered easily and quickly. F. Dump ROM - will dump all screen

modes to an Epson printer. Handles

teletext graphics and double height characters.

- G. Disassembler ROM Watford's latest release.
- H. The Watford DFS claimed to be the most sophisticated DFS software yet written for the BBC Micro.

And there's also the new version of the Watford ROMboard to put them on!

All you have to do to win the lot is to list the eight ROMs in their order of usefulness to the average user.

Then, as a tiebreaker, tell us, in not more than 25 words, the piece of software that you would most like to see on ROM.

Send your entry, on the coupon below, to reach us no later than March 29, 1984.

#### **DECEMBER CONTEST WINNERS**

THE prize for our December competition - three complete Micronet systems - inspired many hundreds of readers to enter.

They had to describe the best use for an old 0.1 OS ROM. And their imaginations ran riot.

Sorting through the entries was a mammoth task but we eventually found three winners whose entries we give below:

- Sindy Old 0.1 ROM toast rack (see picture) - Sam and Wendy Farr, Combe Haybath.
- For testing neurological function. Placed on the patient's chair, the



ROM detects ability to discriminate between 28 simultaneous stimuli. If positive, the investigation indicates hysteria. - Dr B. Bedford, Brockenhurst.

 To be issued to all those customers who are still waiting for a second processor, so that they can have a chip on both shoulders. -R.C. Todd, Royston.

#### Your FREE entry form

List the eight ROMs mentioned above in order of their usefulness to the average user. For example, if you think that a Beeb Printer ROM would be the most useful, put A in box 1, and so on.

Then in not more than 25 words complete the following sentence:

1		The piece of software I would most like to see on ROM is	
3 🔲	8		
lame		Address	

POST TO: ROMboard Contest, Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport, SK7 5NY

Tel. No. -

# There must be more to a micro than zapping monsters

See how much more when you plug into Micronet 800-a multi-million pound database that lets you play games as well.

#### Micronet 800 helps your micro come of age

It is the sophisticated network that many popular makes of micro can plug into via the telephone, giving home micro users new horizons to use and explore.

#### Micronet 800 lets you communicate through your micro...

...By linking you into a network of thousands of micro users who always have something new to say to each other. Through Letters to the Editor, Clubspot (for computer user groups), Swapshop (our electronic bulletin board) and electronic Mailbox, Micronet keeps you in touch with other people who want to do more with computers than just play games.

#### Micronet delivers to your micro our electronic newspaper and PRESTEL

Newsflashes give you news and reviews on new equipment, software and computer applications.

A Microbase dedicated to your type of micro contains technical hints and tips. You also have access to other facilities on Prestel: Homebanking with Homelink, world and business news, teleshopping and much more.

#### Micronet 800 gives you software

Offering you some of the best software bargains around. Through your phone line and straight into your computer. Scores of educational and utility programs are included. And a wide range of terrific games software. Many of which are completely free and constantly changing every few weeks – just in case you want to take another zap at those monsters again.



MICRONET 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Telephone: 01-278 3143.

# Recognition of Information Technology

#### Systems Innovation of the year

## It's enough to blow the mind of any micro!



One of the many faces on Prestel

DENARY Derrick is designed to help young children to get practice with numbers, and in so doing, get used to a computer keyboard.

The program will play two games. The first requires the defender to fire rockets by pressing the key which has the same number as Derrick is carrying.

Once the correct key is depressed a rocket is launched, and can be guided by the Left and Right keys.

It is not very difficult to hit Derrick once the rocket is fired. The aim of the game is to stop him, but the essential tactic is to get the correct number.

Once the first game is mastered the major role of Derrick can be used. In the system of counting we use 10 is very important. The columns in base 10 (denary), represent units, tens of units, tens of tens, and so on.

It can be seen that relating numbers to 10 is very important. The numerical difference between a number and 10 is fundamental in subtraction, and thus in many more complex calculations. This is where Denary Derrick comes in.

The second game is almost identical to the first but rockets are only launched if the key representing the difference between Derrick's number and 10 is pressed.

For example, if Derrick has a 1 the rocket will only be fired if 9 is pressed.

If Derrick is hit he is merely teleported back to the top of the screen where he will collect a different number. A hit scores 10 points.

When Derrick lands for the third time a score card is displayed showing the last score and the total overall. The program then returns to the rule sheet and the player can reselect game one or two.

The program itself has a simple structure. PROCintro gives the idea of the game while PROCdefine sets up tables of data and defines characters.

Then there are three nested REPEAT loops. The outermost, a continuous loop, will rerun the game until BREAK or ESCAPE is pressed.

The second loop allows game one or two to be selected before each go, ending when Derrick has landed for his third time.

Inside this is a loop which keeps Derrick moving down until he is hit or has landed.

PROCbase checks to make sure the launch pad can be moved, and if so prints it in its new position.

Similarly PROCspider does the

The count down is on!

# By KIM WEST and PAUL PASSANT

same for Derrick (note line 400 - VDU48+N% is used to print the required figure on Derrick).

FNhit acts as a shield around Derrick, checking if the rocket has reached him.

All the machine code for printing Derrick is assembled in PROCdefine along with all the data and characters.

To ensure Derrick carries different numbers on subsequent descents PROCinit sets NI% to the old value of N% (Derrick's number), and picks random values of N% until it is different to NI%.

KEY% is the Ascii value of the number which should be pressed. Lines 1530 and 1540 calculate KEY% depending on which version of the game is being played.

Several colours are changed with VDU19, the flash rate increased so Derrick's eyes move faster, and printing is sent to the graphics cursor ready to print Derrick.

PROCupdate briefly returns printing to the text cursor and prints the score.

On landing all colours are changed to blue except one for the printing, PROCland also plays a tune and then resets the colours ready for the next descent.

PROCanother gives the sheet, last score and running total. Finally PROCexplode teleports Derrick with the aid of some interesting machine code which fragments his part of the screen. Denary Derrick is a long listing, but a very educational program for youngsters.

And don't forget, if you haven't the time to type in the listing it is available on tape along with all the other programs in this month's Micro User.



# YOU HAVEN'T SEEN ANY THING LIKE THIS ON A COLOUR MONITOR

BEFORE

An RGB monitor from JVC offering a resolution of 370 x 470 pixels for less than £150?

We guarantee you won't see another bargain like that in this or any other micro mag-or in any other supplier's showroom.

For we've managed to acquire the sole distribution rights to these superb machines and we are able to offer them at an unbeatable price.

There are two models available: medium resolution (370 x 470 pixels) at £149.95; and high resolution (580 x 470 pixels) at £229.95. (Both excluding VAT.)

The units have a 14" screen and are suitable for the BBC Micro, Lynx, Oric, Apple, and most other leading micros.

They are robustly constructed in a handsome cream casing. And come with a full year's guarantee.

Delivery is good: your monitor should arrive by courier service within ten days of our receiving your order.

You can order by filling in the coupon below and posting to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Or by telephoning 01-701 8668 quoting your credit card number. Or, of course, you can buy in person at our showroom between 9am-6pm Monday-Friday, 9am-1.30pm Saturday.

MODEL REFERENCE	1302-1 Medium Resolution	1302-2 High Resolution
RESOLUTION	370 x 470 Pixels	580 x 470 Pixels
C.R.T.	14"	14"
SUPPLY	220/240v. 50/60Hz.	220/240v. 50/60Hz.
E.H.T.	Minimum 19.5kv Maximum 22.5kv	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	6MHz.	10MHz.
DISPLAY	80 characters by 25 lines	80 characters by 25 lines
SLOT PITCH	0.63mm	0.41mm
INPUT: VIDEO	R.G.B. Analogue/ TTL Input	R.G.B. Analogue/ TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control	On/off switch and brightness control



Telephone:	Opus Supplies Ltd
Address	
Name	
Please state the ma	ke of your computer
(please tick) no. is	
	for ⩔ please debit my credit card mount of & My Access/Barclaycard
carriage costs £187	esolution Monitor including VAT, lead, and 7.39. A High Resolution Monitor including iage costs £279,39.)
Lunderstand carria	ige per monitor will cost an extra &7.00.
	Connection lead(s) at £6.00 each.
1-1-	High Resolution Colour Monitor(s) at £229.95 each (ex. VAT).
Please send me	Medium Resolution Colour Monitor(s) at £149.95 each (ex. VAT).
To Opus Supplies L	td., 158 Camberwell Road, London SE 5 0EE

BUB

### 

# LORDS OF TIME Joins our range of acclaimed pure-text puzzle adventures, at £9.90, for:

BBC 32K COMMODORE 64 SPECTRUM 48K LYNX 48K NASCOM 32K ORIC 48K ATARI 32K

#### **ADVENTURE** REVIEWS

Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners . . I am extremely impressed .. The Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Cave (Adventure) is nothing short of brilliant; rush out and buy it. While you're at it, buy their others too. Simply smashing!"

-SOFT, Sept 83

I found Dungeon exceedingly well planned and written, with a fast response. There are well over 200 locations and the descriptions are both lengthy and interesting. The objects number about 100. It could therefore take some months to explore the whole network, giving many hours of enjoyment in the process."

- C&VG, Sept 83

The descriptions are so good that few players could fail to be ensnared by the realism of the mythical worlds where they are the hero or heroine ... great fun to play."

-Which Micro?, Aug 83

My appetite has been whetted and I intend to get my own copy (of Snowball) to play."

- What Micro?, Dec 83



#### **ADVENTURE** REVIEWS

"This has to be the bargain of the year. If adventures are your game then this (Colossal Adventure) is your adventure."

-HCW, 5 Sept 83

"Colossal Adventure is simply superb. Anyone who wishes to use adventures in an educational setting really must use and see this program as it emulates Crowther and Wood's masterpiece so well. For those who wish to move onto another adventure of similar high quality, Dungeon Adventure is to be recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"

- Educational Computing, Nov 83

Colossal Adventure is included in Practical Computing's Top 10 games choice: "Poetic, moving and tough as hell."

-PC, Dec 83

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you"

- NILUG # 1.3

"Colossal Adventure . . For once here's a program that lives up to its name . . a masterful feat. Thoroughly recommended"

- Computer Choice, Dec 83

"wholly admirable" - Your Computer, Sept 83

#### MIDDLE EARTH ADVENTURES

#### 1: COLOSSAL ADVENTURE

A complete, full size version of the classic mainframe game "Adventure" with 70 bonus locations added.

#### 2: ADVENTURE QUEST

Centuries have passed since the time of Colossal Adventure and evil armies have invaded The Land. The way is long and dangerous; but with cunning you can overcome all obstacles on the way to the Black Tower, source of their demonic power, and destroy it.

#### 3: DUNGEON ADVENTURE

The trilogy is completed by this superb adventure, set in the Dungeons beneath the shattered Black Tower. A sense of humour is essential!

#### THE FIRST SILICON DREAM ADVENTURE

#### 1: SNOWBALL

The first of Pete Austin's second trilogy. The giant colony starship, Snowball 9, has been sabotaged and is heading for the sun in this massive game with 7000 locations.

#### THE LORDS OF TIME SAGA

#### 7: LORDS OF TIME

Our congratulations to Sue Gazzard for her super design for this new time travel adventure through the ages of world history. Chill to the Ice-age, go romin' with Caeser's legions, shed light on the Dark Ages etc. etc. We'll be selling this game mail-order from January 1st.

#### Price: £9.90 each (inclusive)

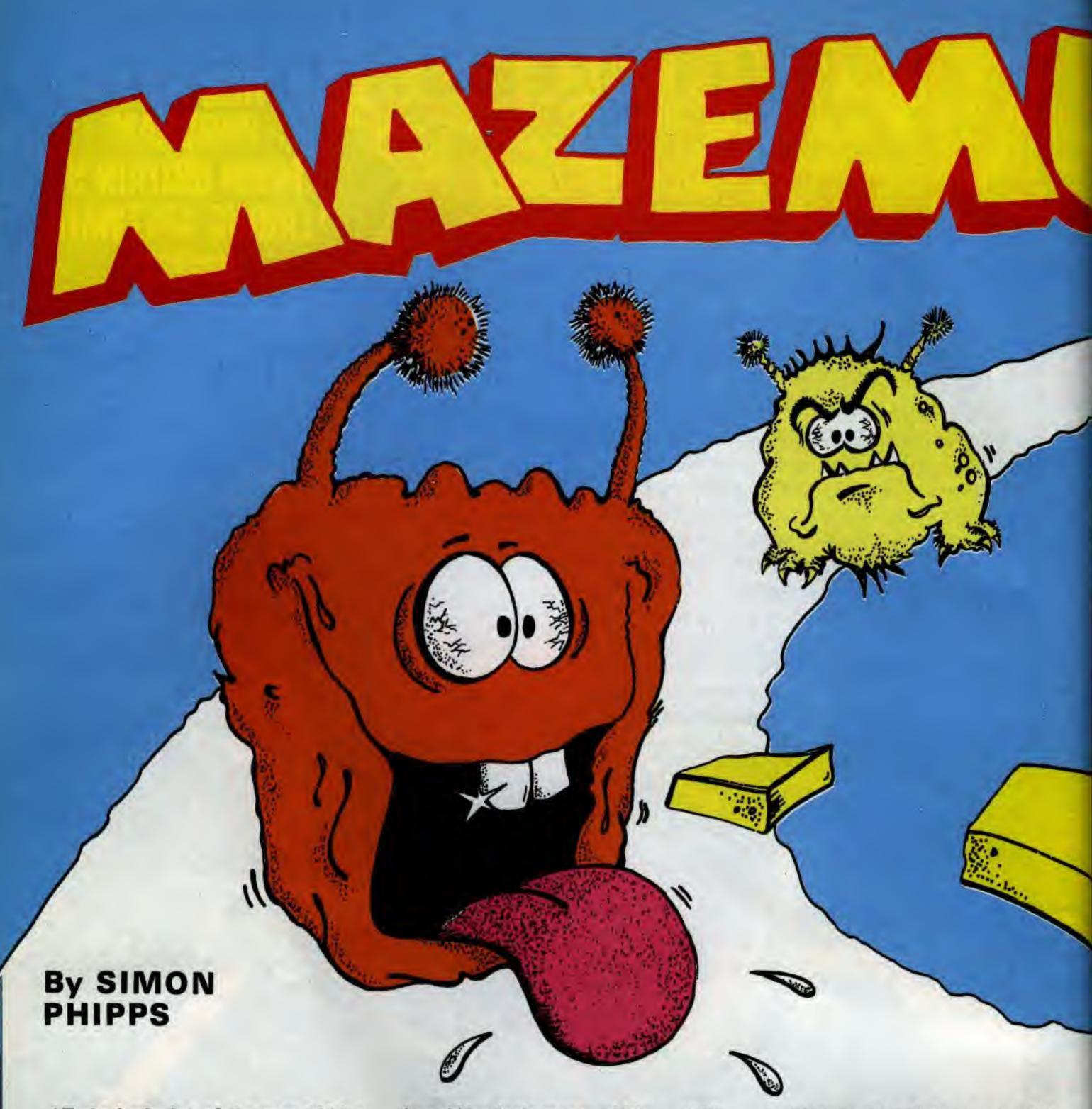
Level 9 adventures are available from good computer shops, or mail-order from us at no extra charge. Please send order. or SAE for catalogue, to:

#### LEVEL 9 COMPUTING

Dept U, 229 Hughenden Road, High Wycombe, Bucks HP135PG

Please describe your Computer





AT the beginning of the year 1984 a mad 17-year-old computer genius (huh!) produced nightmarish mutant creatures by disassembling the darkest recesses of his 1.2 MOS.

These creatures, obsessed with the task of chasing anything that moved, soon took over his BBC Micro and placed nasty bugs in exactly the wrong parts of the program.

The creatures, designated under the code name of Goojgies, ran riot and after a year of feverish work on school micros and programmable calculators, this whizz kid created a solution to the problem . . . the Munchers!

Operating under manual control, the Munchers were sent out to clear the bug-ridden logic mazes of Bits - small binary digits that would cause the terrifying Bad Program error if ever introduced in the wrong addresses.

To the assistance of our fearless pink heroes came the Nibbles – powerful bits that when eaten sent the Goojgies into fits of terror and while active, allowed the Munchers to devour these unsavoury creatures and temporarily stopped their evil doings.

Soon rogue graphics characters in the form of strawberries, birds, cherries, keys, bells and plums helped nourish the Munchers. But after a tough fight the graphics left and now my MOS is completely free of any problems.

Just to make certain that your BBC

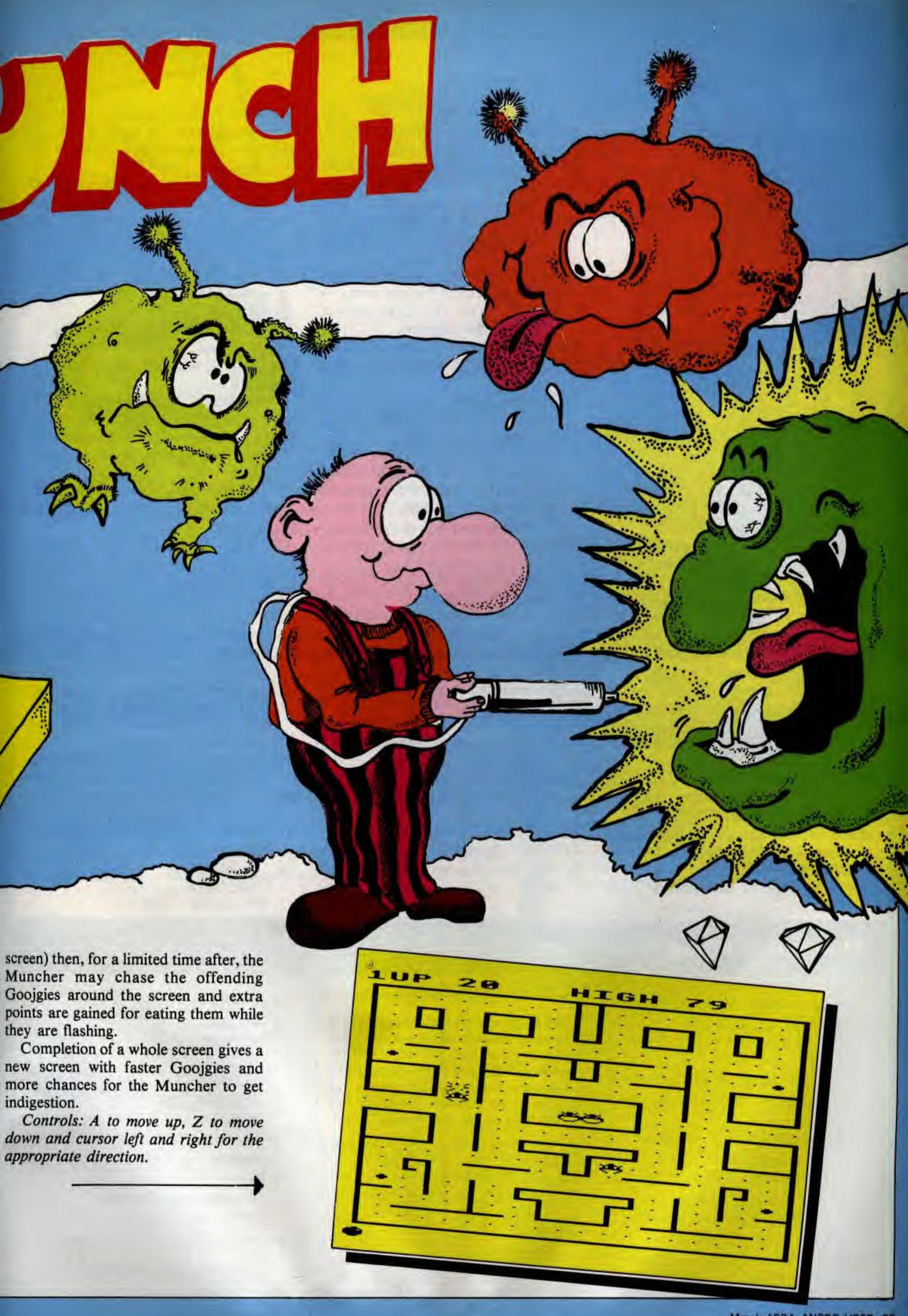
or Electron doesn't have any of these nightmarish fiends, start typing. Or better still, send for the cassette version – you never know when you will have trouble with your Goojgies!

In case you didn't recognise it from the foregoing, the game is quite simply a version of a classic arcade game. For those of you who have never played it before, here's a short summary.

The object is to move the pink Muncher around the screen, eating the dots and bonus fruits.

To make things more difficult you are pursued by two evil monsters who kill on contact.

If one of the flashing Nibbles is eaten (there are four, one at each corner of the





#### From Page 65

PROCEDURES:-

PROCCHARS: Defines characters 224-255 for game.

PROCSCREEN: Draws the maze and sets up the score display.

PROCINIT: Defines the strings for the fruit, positions of Muncher and Goojgies.

PROCMEN: Prints out the appropriate number of lines in the central box.

the number of fruit representing the number of completed screens.

PROCMAN: Moves Muncher around the screen making appropriate checks.

PROCFRUIT: Prints out bonus fruit on the screen.

PROCGHOST: Controls Goojgie movement, incrementing positions and calling PROCMOVE.

PROCMOVE: Designates direction of Goojgie movement calling PROCX and PROCY.

PROCX: Controls increment of Gooj-

gie's X co-ordinate.

PROCY: Controls increment of Goojgie's Y co-ordinate.

PROCPEEK: Checks the screen array to return the value of the character the Goojgie is to move onto.

PROCDIE: Kills the Muncher and resets Goojgie and Muncher positions.

PROCDED: Displays 'game over' and checks whether present score is greater than the high score, re-running the program.

PROCREPLACE: Resets Muncher and Goojgie positions to starting positions.

PROCCOLOURS: Flashes through colours redefining colour 4 for completion of a screen.

PROCCHECK: Checks to see if Goojgies are eaten by the Muncher.

PROCMUNCH: Eats a Goojgie and replaces it to its starting position.

VARIABLES: -

A%(x,y): An array storing the characters at the screen print positions.

GX%(n): An array storing the Goojgies X co-ordinate values.

GY%(n): An array storing the Goojgies Y co-ordinate values.

OG%(n): An array storing which character was present on the character cell upon which a Goojgie now stands, allowing the Goojgies to pass over the dots without blanking them out or placing them where they shouldn't be.

A\$(n): A string array storing the characters that make up the bonus fruit.

NG%: Number of Goojgies on screen. LIVES%: Number of lives left.

SCREEN%: Number of screens completed. PEEK%: Value of character in screen array produced by PROCPEEK.

DGX%: Increment on Goojgies X co-ordinate.

DGY%: Increment on Goojgies Y co-ordinate.

T%: Variable controlling which Goojgie is to be moved during one game cycle.

A%: Variable returning the INKEY value of the key pressed for Muncher movement.

P%: Increment on Muncher's X co-ordinate.

Q%: Increment on Muncher's Y co-ordinate.

X%: Muncher's X co-ordinate.

Y%: Muncher's Y co-ordinate.

L%: Character present in error array to which Muncher is about to move onto.

EAT%: Number of bits (dots) eaten. If EAT%>212 a new screen is generated.

C%: Variable swing present Muncher character – that is, whether mouth is open or closed.

SC%: Score obtained by Muncher.

H%: Before the program is RUN set to zero since this holds the value of the high score. Line 20 checks for a -ve value just in case this is neglected and H% exists from a previous program.

A,X,Y,C: Variables used to set up the maze when the data on lines 410-660 is read and manipulated.

J%: Variable used in PROCCHECK to see if any Goojgies have been eaten.

F: Variable used in FOR-NEXT loop in PROCCOLOURS.

J: Variable used as delay loop in PROCCOLOURS.

M: Variables used as delay loop in PROCDED.

#### Mazemunch listing

10 REM MAZEMUNCH by Simon Phipps

15 REM (C) THE MICRO USER

20 IF H%(OHX=0

25 CLS

:PRINT TAB(0,16)"INITIALISING" :FOR WAIT=1 TO 2000

: NEXT

30 ENVELOPE 3,1,10,20,-30,10,5
,15,127,-2,0,-1,127,100
:ENVELOPE 1,1,1,34,86,25,25
,40,126,0,0,-126,125,0
:ENVELOPE 2,1,-16,-6,1,10,45
,60,127,0,0,-127,126,0

40 MODE 2 :TIME =6000 This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

:VDU 23;8202;0;0;0; :DIM AX(19,26),6XX(2),6YX(2),06X(2),A\$(5) +FX4,1

50 \*FX4,1 60 \*FX11,1 70 \*FX12,1 80 ON ERROR GOTO 1040

90 PROCCHARS

: PROCSCREEN

: PROCINIT

: PROCHEN

: PROCSCREENCOUNT

: REPEAT

:FOR SX=OTO 12-SCREENX

: PROCHAN

: NEXT

:IF RND(200)(10 PROCFRUIT ELSE IF RND(200)(10 A%(10,10)=32 :PRINT TAB(10,10);" "

Turn to Page 151



RUN CITIES, COUNTRIES CONTINENTS- BUT, BE WARNED! Someone is about to press the button Apocalypse of STRATEGY

REDSHIFT HAS MADE THE WORLD OF WAR GAMES ORIENTATED COMPUTER GAMES ITS OWN" P.C.W. - 24/30 NOV 83

The leading game (APOCALYPSE) has four different maps, on any one of which you may fight your war (see section A.). An additional tape which contains a further six maps may also be added to expand your atlas (see section B.). Alternatively, you can be NERO in the FALL OF ROME or Napoleon's right-hand man in NAPOLEON'S CAMPAIGN in 1813 (see section C.). Can you survive the War of 1984 or could you lead your marines from island to island in the PACIFIC war? (see section D.).

#### NEW RELEASES!

NEBULA A masterly introduction to a strategy game! **48K Spectrum** £6.95 inc. VAT and P&P

REBELSTAR RAIDERS Can you survive the Rebel Star Raiders? **48K Spectrum** £9;95 inc. VAT and P&P

FIRST EMPIRE Your introduction to complete "Table top moderated war games" 48K Spectrum & BBC \*COMING SOON\*

TIME LORDS Get entangled in the complexities of time travel . . . \*COMING SOON\*

#### REDSHIFT LTD.

12c MANOR ROAD, STOKE NEWINGTON, LONDON, N16 TEL: (01) 800 1333



Apocalypse is produced under licence from The Games Workshop Ltd.



For: Spectrum 48K & **BBC Model B** £9.95 inc. VAT and P&P. Available from J Menzies, Boots & Microdealer UK.

C. Volume 2: **CHAPTER 1 FALL OF ROME** NAPOLEON'S CAMPAIGNS S AFRICA NETHER EARTH D. Volume 2:

SE ASIA STAR SYSTEMS

Volume 1:

ARCTIC CIRCLE

**CHAPTER 2** THE 1984 **PACIFIC WAR** 

**NOVAMAPS** 

USA

Six New Maps!

Expansion Kits for Spectrum 48K (B, C & D only) £4.95 each inc. VAT and P&P.

Microdrive version available by negotiation

HOW TO ORDER. You may purchase any of the items listed by cheque or postal order. All you have to do is fill in the details in the coupon enclosing your cheque/P.O. made payable to BINDEMAN Ltd. and your order will be dispatched within 7 to 14 days. All prices

	SHIFT	TD, 12c MAN	OR RD,	STOKE NEWING	TON, N16
I would like to (Please circle					
ABCD	(For Apo		able for	BBC/Specrum (Del	ete which
☐ Nebula		Rebel Star Raiders		First Empire	
Time Lo	rds				
I enclose my	cheque/P.	O. for £	******	***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Name			****		esecretaring.
Address	.,				
			,.m		
************************				*********************	

#### "EXCELLENT FAST SERVICE -

#### EVEN DOWN HERE"

(M. BULLEN, FALKLANDS, South Atlantic)

## SOFTWARE SUPERMARKET

At Software Supermarket, we play all the programs we can get for the BBC Micro (and the Spectrum - send 50p stamp for a catalogue for either! FREE catalogue with each order). We put just the best of each type of program into our ads and catalogues. We don't have the biggest list of programs - just the ones you'll really enjoy for a long time. They come from many different companies, large and small, famous and just-about-to-be-famous. We produce no programs ourselves, so our choice is quite impartial.

We quote reviews from all the magazines to help you decide. We tell you if your joystick will work - all programs run with keyboard control, too. We save you money by choosing the best - and we send them fast, which saves you hunting round the shops. From over 40 countries you write praising our same-day despatch. Mail order or telephone credit card orders only please. Prices quoted include U.K. VAT. For orders abroad, prices are the same. You can phone VISA or ACCESS credit card orders to us on 01-789 8546 at any time, from any country where your own regulations permit this.

#### **ALL PROGRAMS FOR 32K BBC**

#### CRAZY PAINTER One of the classic, addictive arcade games. And the ONLY

FULL-FEATURE VERSION AVAILABLE FOR YOUR BEEB. It is great fun. On screen one, you are a monkey being chased by Africans. Paint in all the squares and get to a bonus screen and go bananas. Then you go on, but watch out for the Teddy Bears. Good graphics and music! Illogical, but unputdownable! Joysticks OK. (Superior) £7.95

#### INBALL ARCADE DESIGN YOUR OWN PIN-TABLES! This really is a

d-i-y program. One example pin-table is included, but the fun is in designing your own (and saving them). PLAY is very convincing as you move the flippers, call the next ball and pull the lever. You can add or take away 38 different springs and wires and flashing lights and bumpers, move them all around the table, alter their scores, or their bounce, alter the flippers, even tilt the table. You can change just about everything quickly and easily. And then you can play with the result. Be a Pinball Wizard, now, and design the perfect pin-table. NO JOYSTICKS. (Kansas) £10.00

#### TWIN KINGDOM VALLEY FIRST

GRAPHIC ADVENTURE FOR YOUR BEEB! Not only is it a good adventure but all 175 locations are drawn in full-screen hi-res graphics - and the drawings are beautiful, too! (Some contain clues as well.) 36 commands: plain English input: real-time adventure and 6 control options. It is simply the most sophisticated (and the prettiest) adventure we've ever played on our Beeb. (Bug-Byte) £9.50

#### CALL 01-789 8546 (24 hours) CHARGE PROGRAMS TO VISA OR ACCESS

The state of the state of	narket OR Charge my VISA/ACCESS/EUROCARD/	to
		***************************************
	arly. If we can't read it, you won't get it.	
Name		and the Contract of the Contra
	Postcode	***************************************
Phone, if any, ir	case of query	Price
	PROGRAM NAME	rice
		L
		£
12		· C
		L
		£
		£
		£ £
POSTAGE	U K Add 55p only per order	£
POSTAGE	U K Add 55p only per order  EUROPE Add 55p for each program	£
P. Street, Str		£ £0 55p

#### CYLON ATTACK "OUTSTANDING ... Quite simply excellent ... the graphics leave most other games standing." (MicroUser) It is pretty staggering - so are the 3D graphics. You will

believe you are launching from and docking with a mothership: you will see and feel you are refuelling. You will know just when you can kill the enemy as your sights change shape. UNIQUE 50-PLACE HI-SCORE TABLE CAN BE SAVED FROM GAME TO GAME.

Now why don't all the programs do that - it's a great idea. JOYSTICKS O.K. (A & F) £7.90

FALGAR Totally original new game, as you command your way through the graphic battle of Trafalgar. Great full-screen overhead line-of-battle pictures, as you choose your enemy ship and then sea-level viewpoint as you watch the two ships fight to the death. 1 or 2 players: FIRESHIPS can be launched (and blown up, if you're smart): your broadsides are very controllable and the graphics are very watchable. It makes a nice change from the space race. NO JOYSTICKS.

#### (Squirrel) £8.00 AMBUSTERS Combines the excitement of 'Scramble' with the skill of inflight simulation.

Join 617 Squadron and destroy the Mohnesee dam with your bouncing bombs - if you get your lights right, avoid the enemy fighters, the hidden gun batteries. And if your distance counter works. Very exciting: very skillful: unique. It gets more difficult each time you fly. No joysticks. (Alligata) £7.95

"The puzzles are logical and the program is enthralling ... well worth the money." (MicroAdvent)

The greatest ever text adventure. Over 7 thousand locations! As Kim Kimberley, agent extraordinary, you must safeguard Snowball 9, 700 messages; vocab over 200; every object has a purpose. Written in super-compact a-code. Helpful manual. NO JOYSTICKS. (Level 9) £9.90

noisy, fast, colourful and compulsive." (YrComp). Original: great sound and action: good full-screen graphics. The game is set inside your computer as you guard the CPU from the attacks of the chips! 50 alien chips on each sheet: every 4 levels, life gets harder! You choose whether to continue with a game or enter the hi-score ladder. NO JOYSTICKS. (SoftSpot) £6.95

#### HE HOBBIT "Sheer adventure...a must for all aspiring adventurers." (CompAnswers) At last a BBC version of one of the greatest adventures ever! Text only, but every detail of the plot is the same as the famous Spectrum version. FREE 285pps illustrated book with clues. Unique real-time quest: 80 locations: massive vocabulary: accepts multiple commands in plain English: 16pps manual. It IS as good as you've heard! NO JOYSTICKS. (Melbourne House) £14.95

TPTTTT "Nothing short of manna from heaven." (PersCompNews) The least exciting name we've heard for one of the most exciting games we've played. How about flying your Beeb/X-Wing Fighter down the 3D Trench towards the Death Star-style target, dodging the tie-fighters as they attack? 9 skill levels: sensational graphics. JOYSTICKS O.K. (Virgin) £7.95

"This game can damage your brain." (PersCompGames) "An original and amusing game" (PersCompNews) AT PRESSTIME YOU CAN STILL WIN THE £6,000 GOLDEN SUNDIAL OF PI! Simply by solving this wonderfully witty adventure. Brilliant use of music and graphics. NO JOYSTICKS (Automata) £10.00

TB ALLEY "Very addictive game...good value for money."
(Beebug) Beautifully executed 3D simulation of an air-sea battle. Just defend your ships against air attack. Some of the most complex graphics we've seen on the BBC. JOYSTICKS OK. (Software Invasion) £7.95

A D A R NEW graphic battle game: NOT an adventure or arcade game. A gripping simulation of small-unit actions. Command 15 men: 10 possible actions for each man, each move: 10 skill levels: 2-part game, first secure your retreat and then destroy the bridge. Absorbing. NO JOYSTICKS (Lothlorien) £6.95

simulator around that runs on the Beeb...a must for all budding pilots." (PersCompNews) By Captain Roger Selby of British Airways. You're in charge of a 747 which you may land at either Heathrow or Gatwick. 11 control keys: 11 control keys: clear instrument display: good runway view as you approach: 8-pps on-screen flight briefing. Realistic crashes, but instructive flights too! NO JOYSTICKS. (Dr Soft) £8.95

THE Editor asked me what this month's article would be about. "The sound effects channel, sir", I answered meekly.

He staggered off to a lunch time planning meeting at the Ram and Buffer and I settled down to my work. I nearly leapt out of my skin when he crept up behind me and yelled "Boo".

"So that's how sound affects you", he cackled as he dodged the User Guide.

AS I told the Editor, this month we'll be covering the sound effects channel. This is the channel you select by making the first parameter of the SOUND command equal to zero.

You'll be using lots of SOUND commands such as:

SOUND 0,-15,2,40

With channel 0 you can create all sorts of weird and wonderful effects – especially when you start to use the ENVELOPE command which we'll come to in next month's Micro User.

In all there are eight basic sound effects available on channel 0. You can get them by making the pitch parameter of a channel 0 command equal to a number between 0 and 7.

Type in Program I, run it and you'll get a conducted tour through the various noises. Figure I summarises the result each value of the pitch parameter has on a channel 0 SOUND command.

10 REM PROGRAM I

20 REPEAT

30 FOR pitch=0 TO 7

40 CLS

50 PROCnoise(pitch)

60 NEXT pitch

70 UNTIL FALSE

80 END

90 DEF PROChoise(pitch)

100 PRINT TAB(5,5) "This is noise number ":pitch:"."

110 IF pitch=3 OR pitch=7 THEN PRINT TAB(5,15) "This can be varied by using" TAB(5,17)" a sound on channel 1"

120 PRINT TAB(5,20) "Press a key for next noise."

130 SOUND 0,-15, pitch, 255

140 Wait=GET

150 SOUND &10,0,0,0

160 ENDPROC

# Rocket attack? No, it's just white noise

So to use the sound effects channel we use a SOUND command such as:

SOUND 0,-15,pitch,20

where pitch has a value between 0 and 7. The value you give to pitch decides what kind of sound effect you get.

As you'll see from Figure I, putting in values of 0, 1 or 2 all give something called "periodic noise".

If pitch is equal to 0 you get high frequency periodic noise. Enter:

SOUND 0,-15,0,40

and you'll see (or, rather, hear) what I mean.

As you might guess, values of pitch of 1 and 2 give medium frequency and low frequency periodic noise respectively. Try:

SOUND 0,-15,1,40

and:

SOUND 0,-15,2,40

if you don't believe me.

To hear all three in order run Program II.

10 REM PROGRAM 11

20 FOR pitch=0 TO 2

30 SOUND 0,-15,pitch,20

40 NEXT pitch

This should help you hear the difference between the three. If you want you can use a selection of periodic noises to produce something approaching a "Close Encounters" noise.

Program III does this by playing each of the periodic noises in turn over and over, the duration of each note getting less each time round the REPEAT... UNTIL loop.

10 REM PROGRAM III

20 time=20

30 REPEAT

40 FOR pitch=0 TO 2

50 SOUND 0,-15,pitch,time

60 NEXT pitch

70 time=time-2

80 UNTIL time=0

Notice that it is time and not TIME in the above program. TIME refers to the internal clock of the micro and could cause some funny results if used!

For the moment let's ignore what happens when you make the pitch equal to 3 and go straight on to what happens when you make it 4, 5, or 6.

If pitch has these values, channel 0 produces "white" noise.

If you want to know what that is then enter:

SOUND 0,-15,4,100

This will give you five seconds of high

Value of P Noise produced on channel 0

O High frequency periodic

1 Medium frequency periodic

2 Low frequency periodic

3 Periodic – frequency depends on pitch of channel 1

4 High frequency white

5 Medium frequency white

6 Low frequency white

7 White – frequency depends on pitch of channel 1.

Figure I: Pitch values on channel 0

#### More sound advice from NIGEL PETERS

#### From Page 69

frequency white noise. It won't come as a surprise to learn that:

SOUND 0,-15,5,100

will give you five seconds of medium frequency white noise and:

SOUND 0,-15,6,100

five seconds of low frequency white noise.

Try Program IV which plays all three one after the other for a gradually decreasing time.

It's very like Program III, so don't type it all in again. Just use the Copy key and change the lines you have to:

10 REM PROGRAM IV

20 time=20

30 REPEAT

40 FOR pitch= 4 TO 6

50 SOUND 0,-15,pitch,time

60 NEXT pitch

70 time=time-2

80 UNTIL time=0

Now what does all that white noise remind you of? A steam engine?

Try Program V. This uses the white noise pitch parameters in a REPEAT... UNTIL loop to make the sounds of an accelerating engine.

The REPEAT . . . UNTIL FALSE loop takes over when the engine is at full speed.

10 REM PROGRAM V

15 REM STEAM ENGINE

20 time=20

30 REPEAT

40 FOR pitch=5 TO 6

50 SOUND 0,-15,pitch,time

60 NEXT pitch

70 time=time-2

80 UNTIL time=10

90 REPEAT

100 SOUND 0,-15,5,time

110 SOUND 0,-15,6, time

120 UNTIL FALSE

Still, enough of this nostalgia. What about the two values we've ignored? What do they do?

It's quite simple really, if you think about it. We've been using the bit of the SOUND command that we normally use for selecting the pitch (higher or lower) to pick the kind of noise we want, white or periodic.

So how do we change the pitch of the

noise we are making? Can we make the white noise and the periodic noise go up and down in pitch like normal notes on the other sound channels?

The answer is that we can, using values of 3 and 7 in the pitch parameter of a channel 0 SOUND command.

If you put these values in the pitch parameter then the pitch of the noise that is played depends on the pitch of a note that is playing on sound channel 1.

In other words, by using 3 or 7 you can use a SOUND command on channel 1 to alter the pitch, higher or lower, of periodic and white noise, respectively.

Program VI shows this being done with the pitch parameter in line 30 set at three. Run it and see what happens.

10 REM PROGRAM VI

20 FOR pitch=100 TO 200

30 SOUND 0,-15,3,20

40 SOUND 1,0,pitch,20

50 NEXT pitch

As you'll hear, the pitch of the noise goes upwards. This is because the FOR ... NEXT loop is raising the note produced by the channel 1 SOUND command in line 40.

The pitch of the note produced by line 30's channel 0 SOUND command varies with the pitch of the note from channel 1.

If you look carefully at line 40 you'll see that the amplitude has a value of 0 which means that you can't hear what is being played on that channel.

It still varies the noise on channel 0, however. In fact it's a good thing that you can't hear the channel 1 note.

Run Program VII and you'll see what I mean.

10 REM PROGRAM VII

20 FOR pitch=100 TO 200

30 SOUND 0,-15,3,20

40 SOUND 1,-15,pitch,20

50 NEXT pitch

A mess, isn't it?

Now try Program VIII which, like Program VI, plays a rising sequence of periodic noises.

10 REM PROGRAM VIII

20 FOR pitch=50 TO 100

30 SOUND 0,-15,3,40

40 SOUND 1,0,pitch.40

50 NEXT pitch

Both of the duration parameters of the SOUND commands are the same. What would happen if they were different?

Try changing the duration parameter in line 40 to 20 or 10 or 60 and see what happens.

Can you explain the odd effects? I'll give you a clue if you just stand in the

queue!

If you make the pitch parameter 7 instead of 3 in the last three programs you'll see that channel 1 has the same effect. Only this time it's a rising stream of white noises that are produced.

Finally, let's have some sound effects. Run Programs IX and X and you'll see what you can do with 3 and 7 as the pitch parameters.

The first uses periodic noises to produce a motorbike or moped sound:

10 REM PROGRAM IX

20 REM MOTOR CYCLE

30 FOR pitch= 100 TO 120

40 SOUND 0,-15,3,5

50 SOUND 1.0,pitch,5

60 NEXT pitch

70 SOUND 1,0,pitch,80

80 SOUND 0,-15,3,80

90 FOR pitch= 120 TO 100 STEP -1

100 SOUND 0,-15,3,5

110 SOUND 1,0,pitch,5

120 NEXT pitch

130 SOUND 1,0,pitch,20

140 SOUND 0,-15,3,20

The second uses white noise to imitate an unsuccessful rocket!

10 REM PROGRAM X

20 REM ROCKET

30 FOR pitch= 100 TO 200 STEP 4

40 SOUND 0,-15,7.5

50 SOUND 1,0,pitch,5

60 NEXT pitch

70 SOUND 1,0,pitch,80

80 SOUND 0,-15,7,80

90 FOR pitch= 200 TO 100 STEP -4

100 SOUND 0,-15,7,5

110 SOUND 1,0,pitch,5

120 NEXT pitch

130 SOUND 0,-15,6,60

Anyway, that's all for now. If you've liked these sound effects, just wait until we deal with the ENVELOPE command.

As it is, I've got to go and tell the Editor that we're not under rocket attack and that it's safe to crawl out from under the desk.

Sound affects him, too!

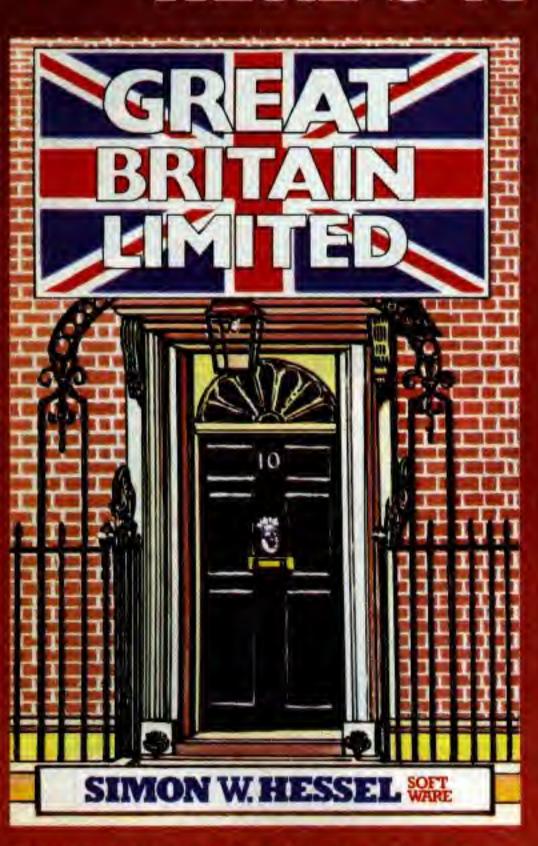
Nigel Peters



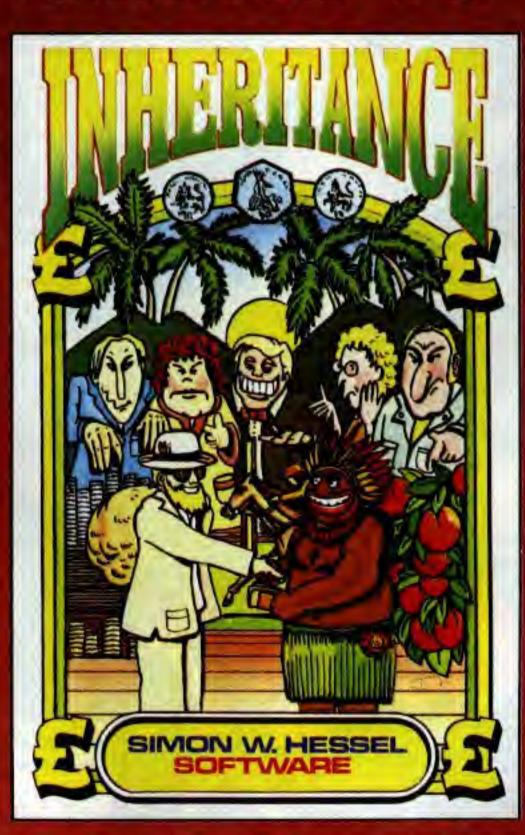
# WHAT WOULD YOU DO WITH ALL THIS?



## HERE'S A CHANCE TO FIND OUT



Ever thought you could run the country better?
Here is your chance as Prime Minister (of the party
of your choice), you have to guide the country
through its social and economic ills for five years,
then put yourself up for re-election.
£6:95\*



Have you ever wondered what you would do if you came into some money? Would you be able to invest it and watch it grow, or maybe start a small business and become a millionaire? With Inheritance you have the chance to find out.

£5.95\*



A game for 1 or 2 players. Your aim is to obtain six souveniers from six different countries and return to London intact, in the shortest possible time. Keep your head and try to avoid hijacks, bankrupl airlines, bad weather, thieves, car breakdowns, strikes and other problems inherent in World Trave

All three in special presentation pack £17.95

Available at good computer shops or direct from: Simon W. Hessel Software

\*30p p&p on single games.

UNLIMITED GUARANTEE

BBC **32**K

24 hour despatch.

INHERITANCE WORLD TRAVEL GAME FINANCIAL GAMES

SIMON W. HESSEL SOFTWARE, 15 LYTHAM COURT, CARDWELL CRESCENT, SUNNINGHILL BERKSHIRE, ENGLAND.

32K



You'll be ITCHING to get your hands on the funniest program of 1984!

Fleas!
Bed Bugs!
And all you
wanted was
a quiet night

The pests are after your feet and you'll have to move fast to stop them. Swot them with a jam sandwich or crunch them with your false teeth.

If you're desperate you can always phone for help. But whatever you do, do it quickly. You need cunning tactics and nimble fingers!

Bed Bugs guarantees hours of hilarity for the whole family.



Obtainable from your Acorn dealer or send in the coupon below

#### **ORDER FORM**

#### Please send me BED BUGS:

- □ BBC 'B' cassette £6.95
- ☐ Electron cassette £6.95
- □ 40-track disc £8.95
- □ 80-track disc £8.55
- Add 50p p&p (post free 2 or more)

Address

- ☐ I enclose cheque made payable to Optima Software Ltd.
- ☐ I wish to pay by
- □ Access □ Visa

No......Signed .....

Expiry date .....

Optima Software Ltd., 36 St. Petersgate, Stockport SK1 1HL.

JUST RELEASED

#### Counter Attack

as demonstrated at the BBC Micro User Show, December 1983.

A game of strategy incorporating unique rotational movement. Simple in concept, stimulating in practice. A game to be equally enjoyed by infants and serious game players alike. Many similar games already exist, however, this game differs from the norm in one distinct area — rotational movement. Includes customisation routine that allows you to tailor the game to your own requirements.

£6.50 for the 32k BBC/Electron

DODGY DEALER

"You'll be hard pressed to find a better business game for the BBC Micro than this grand effort." (TV Choice, Nov. 1983.) "Best of the lot is a new one called Dodgy Dealer; a cracking Christmas present for the bored business exec." (Office of the Future – Nov/Dec 1983.)



"Now available from W.H. Smith and Lightning"

A captivating game emulating the real business world. As boss of a small manufacturing company, you are required to make executive decisions to enable your company to survive and even prosper in the face of strong competition. The game is dynamic: the more your skills improve, the greater the competition becomes.

£6.50 for the BBC B 1.2 o/s

One of the biggest attributes that a computer has is the capability to sort vast amounts of information.

But have you ever wondered how a computer carries out the sorting process?

#### SORT ANIMATOR

is the first in the Computer Tutorial series by OIC, explaining visually and in detail how a selected variety of sorts work. Also includes routines that can be used in your own programs.

£6.50 for the 32k BBC

All products supplied on cassette and can be easily downloaded onto disc.

All prices include VAT and P&P.

Latest reviews of both Dodgy Dealer and Sort Animator can be found on page 600121463 of the Micronet 800 database.

Products available from your local dealer or by mail order direct from OIC at our FREEPOST address.

Barclaycard telephone orders welcome (0344) 773229.

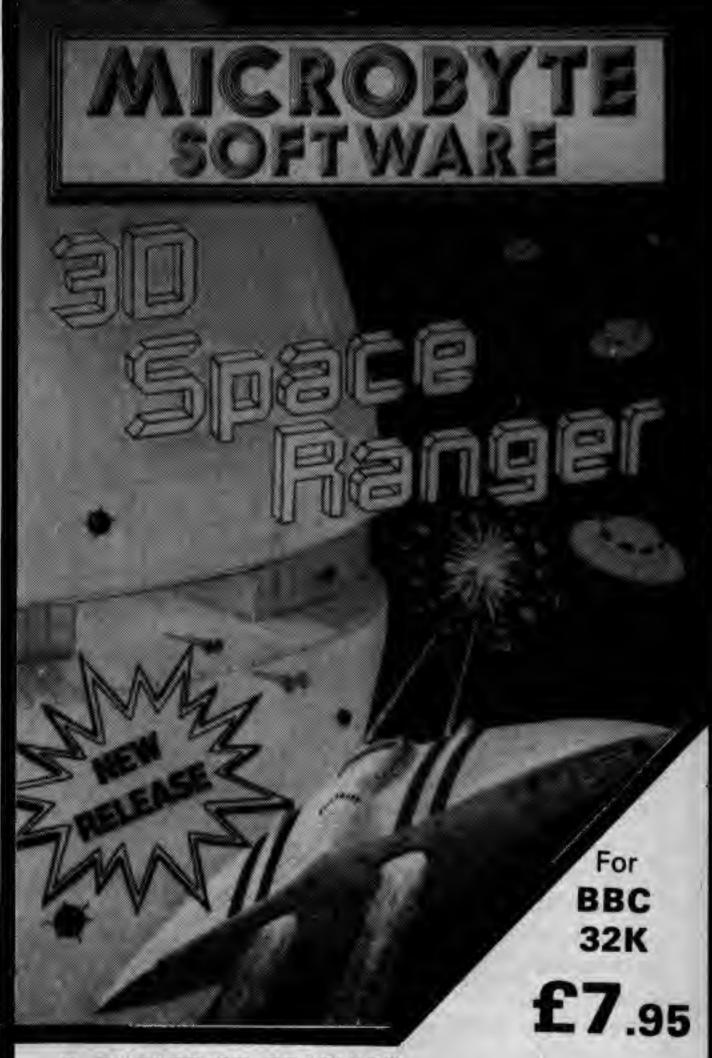
Ask your local dealer for a demo of our products and details of our cream label products or alternatively write to OIC direct

OIC Ltd., Dept. OPD/TMU4, FREEPOST, Camberley, Surrey GU15 4BR

Dealers/distributors contact Richard Edwards on (0344) 773229

Programmers/games designers . . .

send your programs/ideas to us for free evaluation, or send for details of our product development pack. Generous royalties paid on all ideas/games published.

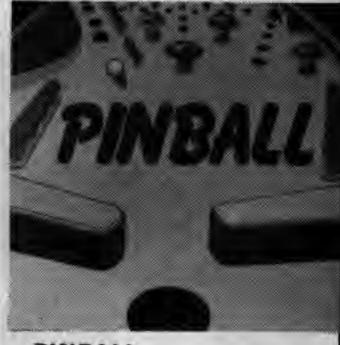


- SUPERB 3D GRAPHICS.
- FIVE DIFFERENT LEVELS OF PLAY.
- ALL MACHINE CODE GAME.
- BATTLE THROUGH SPACE ATTACKS.
- AVOID HURTLING ASTEROID BELTS.
- SKIM OVER THE DEATH STAR SURFACE.
- DESCEND INTO THE TRENCH.
- BATTLE WITH ATTACKING ANDROIDS.
- YOUR MISSION DESTROY THE DEATH STAR . . . AND THEN ESCAPE!



# ER\*BERT Fast and funny, it's Herberts Cubic Domain! You must help him avoid his unwanted guests.

BBC or Electron: £7.95



#### PINBALL

The original arcade table game. Superb graphics and sound.

BBC or Electron: £5.95

REVERSI BBC or Electron:



Orders to:
MICROBYTE SOFTWARE (M2)
FREEPOST
NEWQUAY TR7 2BR.
NO STAMP NEEDED IF POSTED IN U.K.
All prices include Post & Packing.

ALICE continues her perambulations through Adventureland, pausing to view three offbeat programs for the BBC Micro:

> Pimania, Automata Ltd, £10. Community, Ixion Software, £6.90.

Bridge to the East, Ixion Software, £8.05.

THE types of puzzles and problems within an Adventure are unlimited. This month we've tried three games which include some new twists in the usual format such as clues in tunes, economic problems and a mixture of puzzles and keyboard dexterity. The last one was reviewed by nimble fingers Nigel.

Let's start with Pimania:

Remember the Masquerade hare which was buried somewhere in England? All you had to do was solve the puzzles in the book by Kit Williams and then go to the right place at the right time and dig it up.

Pimania is rather similar in that you have to make the program reveal a date and place where the promoters will meet and give to you a golden sundial, worth £6,000, providing you can tell them how you solved the puzzle.

That rule should stop any cheating because you might be able to decode the when and where but how to open the "Ultimate Gate Of Pi" appears to be a nasty factorial problem.

The puzzle has been out for over a year but only recently on the BBC Micro so I presume it is still unsolved.

The program has some animated pictures and begins with the Greek letter PI flying up into the air and the cryptic query, "A key fits the lock?". Give it the keyword and you meet the PI man, who can be helpful, annoyed, unhappy, hungry or bored.

The program is full of tunes which,



# Alice through the VDU Our monthly foray into Adventure games

## Pl man's world hides big prize

after a while, will make you stuff the loudspeaker with cotton wool, but some of them are clues. For example one of them is a hint about how you move around in the PI man's world.

There appear to be, at the start, about 20 rooms to investigate with objects placed randomly in four of them. Their locations shift every time you start a new game.

The map of the game is simple but some rooms are only accessible randomly and the PI man's appearances are also slightly erratic.

The puzzle appears to be to locate a number of objects like a blackboard, calendar and telescope, and drop them at a certain location in the correct order.

There are 3,628,800 ways of dropping 10 objects but the PI man who helps you find the objects also tends to take them back, particularly when you do the wrong thing, so he's still actually helping you.

After a few hours I was still trying to reason out the correct order and getting a bit tired of going over the same ground again and again.

It seems that, like twisty mazes, the only way to make progress is to SAVE and then try, try, try again.

Of course the prize will keep many people at the keyboard. I actually got a



sundial but couldn't remember how did it and failed to drop it anywhere.

It doesn't matter anyway as computer professionals (such as myself) are banned from the competition.

This version has been translated for the BBC and seems to have a few slight bugs. For example, you are told there is a telescope in the room but, when you try to take it, you are told that the program can't see a telescope.

The program can take quite sophisticated sentences like "Give the pork ple to the PI man", which implies that the solution might require quite elaborate commands.

It's an unusual Adventure which, with the prize incentive, should keep the more mercenary among you occupied for weeks.

## Lesson in survival

ALTHOUGH it is not a true Adventure

- because the object is to survive rather
than solve puzzles - Community, from
Ixion, has a number of features that
should appeal to those whose sword
arm has become weary and now wish to
retire to a quiet life down on the farm.

It is derived from the Kingdom game on the BBC Welcome tape which has been popular in primary schools. But this is far more realistic and complicated.

The Magnificent Seven might have saved you from the old bandits in the hills but now you have to contend with bad weather, rats eating the grain and plagues. Your animals will die and your peasants are a particularly revolting lot.

At times you will have to visit the bank manager for a loan and his middle name must be Dracula. (Ah for the good old days when a stake through the heart was the answer and treasure just lay on the ground.)

Teachers, particularly of economics, should find this program very useful because it will not only keep their pupils occupied for hours but should also instil quite a few useful lessons in economic and business strategy.

A multitude of possibilities have to be simultaneously considered and balanced.

You can rear four types of animals and grow four types of grain.

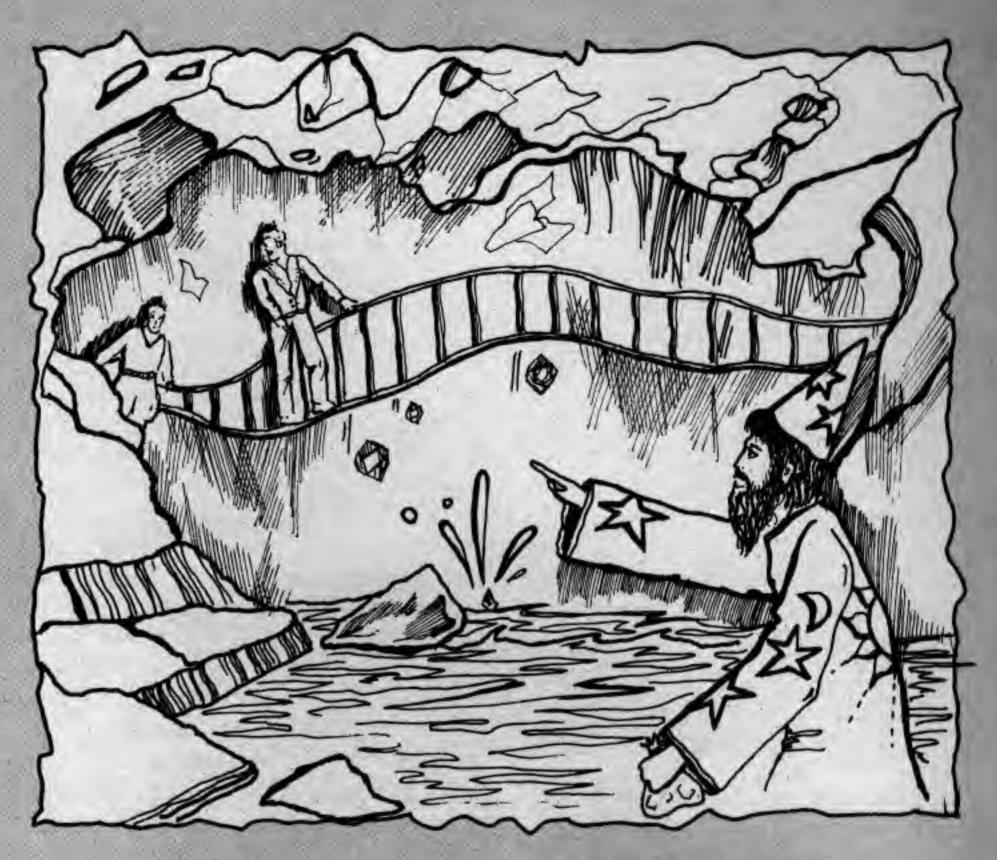
Each type of grain is susceptible to different weather conditions which are predicted by a magician, who is right about half the time.

Having raised and grown some food you must feed your livestock and your peasants and then get the surplus to market.

It's a good idea to feed the rabble because you will need some of them for protection on the way to market as a number of nasty things can happen on this perilous trip.

This game has a number of useful ideas for the Adventure writer. But it is a good program in its own right, particularly if played by a group because then an element of competition can be easily introduced.

Like many other games in this genre you will probably last longer by making conservative decisions. But it's a lot more fun to take gambles.



BRIDGE to the East is different again. It consists of five different screens of interactive games like Rocket Raid and Killer Gorilla, with a different background display for each screen.

Separating each screen is a riddle which has to be answered before you can try the next screen.

On each screen you, in the form of a wizard holding a staff, must protect a specified place – or, in one case, persons – and collect numerous items.

These feats are achieved by moving the wizard shape around the screen with the Z (left), X (right), / (down) and \* (up) keys.

Before each screen you are asked if you want to practice or take the test, which means you are allowed to practice any screen for as long as you like.

This is helpful because if you fail the test you cannot go back — you have to go on to the next screen after answering the riddle.

This is the point where you are told what you must accomplish on the next screen and also the point where you can save the game.

As each screen and riddle is loaded into the BBC separately it is a good idea to save the game as often as possible as it can take a considerable time to progress back to, say, the fifth screen from the start of the game if you happen to fail one of the intervening tests.

Another unusual feature of this game is that, whenever you win or lose, each

#### Bridge over troubled territory

screen has its own piece of poetry which is displayed. Like:

They go, leaving a trail,
Of broken faith
They come, bringing venom
From rotten lakes,
Carved from lead mountains,
With a man's femur.

This does not have any relevance to the game but makes a change from the usual one line saying, "You have been killed", or words to that effect.

The idea behind the game is that once upon a time there were some crystals of power which were destroyed by evil fiends. It is your job to collect the two pieces of the crystal star and score more than 20,000 points, so that a seance can be held and the crystals can be rebuilt.

The two pieces of the crystal star are in the huts on screens 1 and 2, and to get them you have to win those two screens.

So to the screen displays, starting with screen I which is a display of a



valley, with a background of mountains and trees. It contains a red hut which you must protect from all the shapes, which range from birds to rocks, that try to attack it.

On this screen you have to score more than 2,000 points by destroying the attacking shapes and collecting ten crystals which shoot across the screen from right to left, which can prove fairly difficult.

The first riddle gives you a long, rambling monologue followed by a description of a door which is opaque and glowing.

You are also told that no amount of force will cause it to open but, being a wizard, you may effect the door in any other way you choose.

This is a bit like an Adventure type problem but with less clues, as the answer to the problem is to type in 'FREEZE DOOR'.

I think you have to work out this answer because the door is glowing so it must be hot, but if you say 'TOUCH DOOR' you are not given any clues like, 'You just burnt your hand'. All you get is, 'THAT HAD NO EFFECT'.

This example sums up all the following riddles and is the only major criticism that I have of the games.

Also the riddles are not random. So every time you take the tests you will have to answer the same old riddle, which could prove rather tedious.

To find some of the answers I had to resort to listing the program as the clues get even vaguer.

Screen 2 has a background similar in layout to screen 1, but this time your wizard has to protect a pinnacle of rock from a different assortment of shapes. He also has to collect five crystals which shoot across from left to right.

Although similar sounding to screen I this screen is a lot more difficult.

After progressing through the second riddle you arrive at screen 3, which has a totally different appearance.

Your viewpoint is from the inside of a cave looking out through the entrance to the sea where a red sun is setting.

Across the inside of the cave is a bridge over which two figures are trying to cross. Your wizard's job is to escort them safely. You may also collect flying crystals if you have time.

After the third riddle comes the sea hermit's hut, which you have to protect. On this screen the top half of the display is a mountain range running down to the bottom half of the display which is a

## Five into one goes down fine

beach with the sea coming onto it.

You have to collect 26 eggs which are dropped by attacking seagulls. But you have to be quick as the eggs will hatch in no time at all and attack the hut.

On this screen the sounds generated are excellent as you have the sound of the sea washing in on the beach as well as the usual sounds whenever you destroy anything.

And so past yet another riddle onto screen 5, which is a display of a mountain canyon spanned by a bridge, in the middle of which is a large cross.

Here you have to protect the cross from an array of objects. You also have to fight the black prince, who is represented by another figure the size of your wizard which is constantly attacking you.

Your source of magical power is the



cross, so when an attacking object hits the cross the prince gains in strength.

You gain strength by destroying the objects but the prince can do this as well.

You may attack the prince by striking him with your staff above the height of his sword but, of course, he can do the reverse to you and usually does so with more success.

All the time you are battling, your score and the prince's are displayed on the bottom of the screen.

This is the only screen which displays your scores while you are fighting, which is another minor criticism.

I found it exceedingly difficult, requiring the highest degree of manual dexterity of any of the many games I have mastered.

After plucking up courage and a little bit of skill you can take test 5. You then proceed onto the last riddle, which is the conclusive part of the game.

When you have answered this riddle you go into the seance to restore the crystals back to power.

Whether the seance is successful depends on your score and if you won on screen 1 and 2.

If the seance is a success then the crystals are returned to their original power and the forces of evil are left to roam the earth until you attempt the game again.

All of the five screens are laid out in a visually pleasing manner. This, coupled with the high standard of detail in all the moving figures, provides each screen with a different, top quality graphical layout.

The movement of all the figures is to a high standard, being smooth and judder free even when numerous moving objects occupy the screen at once.

The response of your own figure is smooth and responsive to the keyboard controls.

The varied sounds generated are also pleasing, as they don't drag on and on.

The riddles, however, prove to be tedious. Once you have read or answered the puzzle, you don't want to keep seeing and answering the same riddles on every game.

A score display while you are engaged in a game would have been helpful. It proved rather frustrating not knowing how many points you still required to progress further.

In conclusion I found Bridge to the East fairly compulsive and quite a challenge, and well worth the money, as this novel idea is like getting five games in one.

The answers to the riddles are in Figure I, which we've considerately printed upside down!

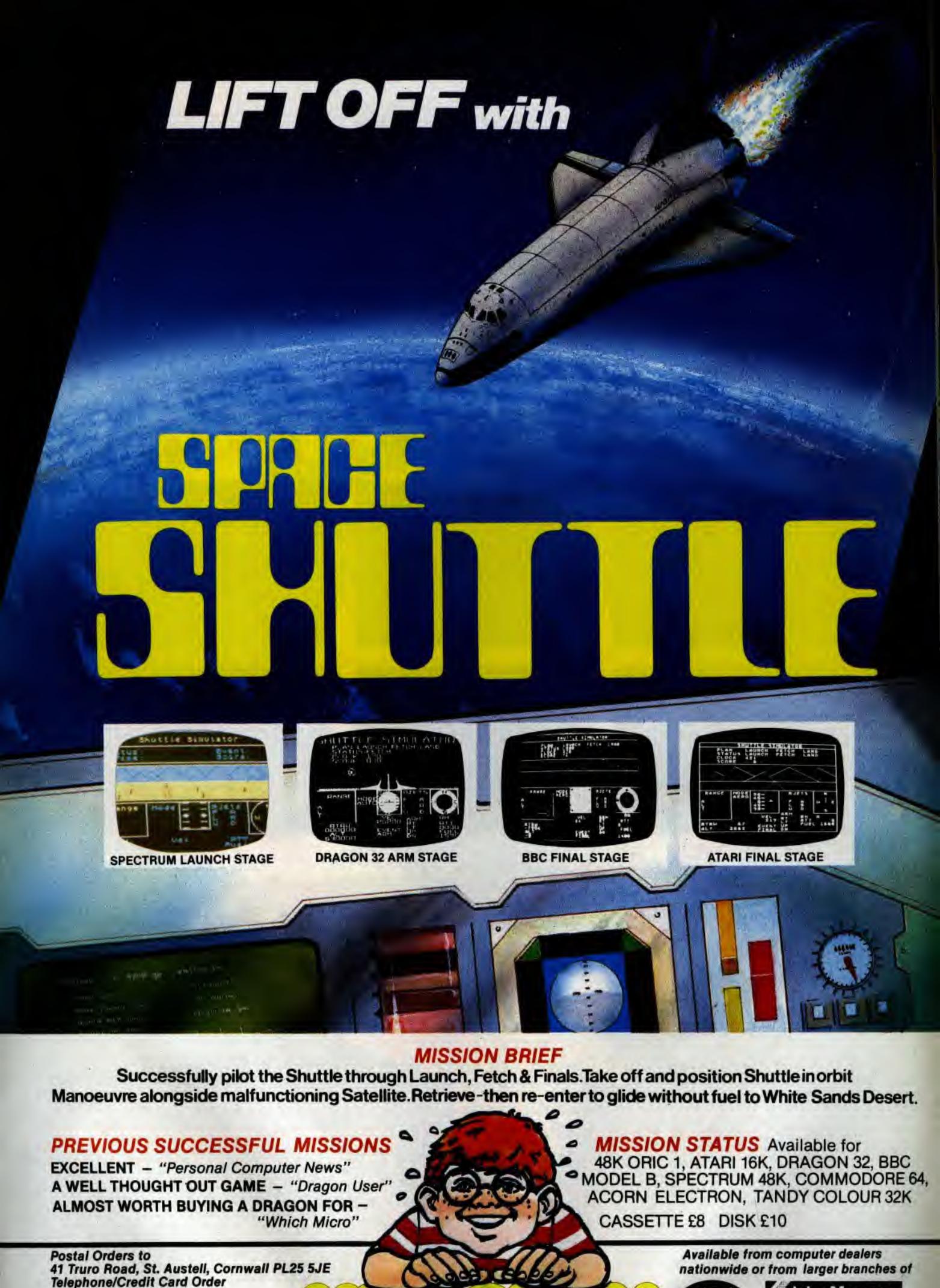
Alice and Nigel

Riddle

3 > 1 AM LYING 5 > 41, 101

7 > DID XOU SAY RALLABATZ
1 > FREEZE BLOCK

Figure 1



Tel: 0726 3456

John Menzies

ORLANDO'S BACK!

## ZALAGA

Aardvark Software, creators of the Ultimate Atom Games, bring you NOW

THE ULTIMATE BBC SPACE-GAME













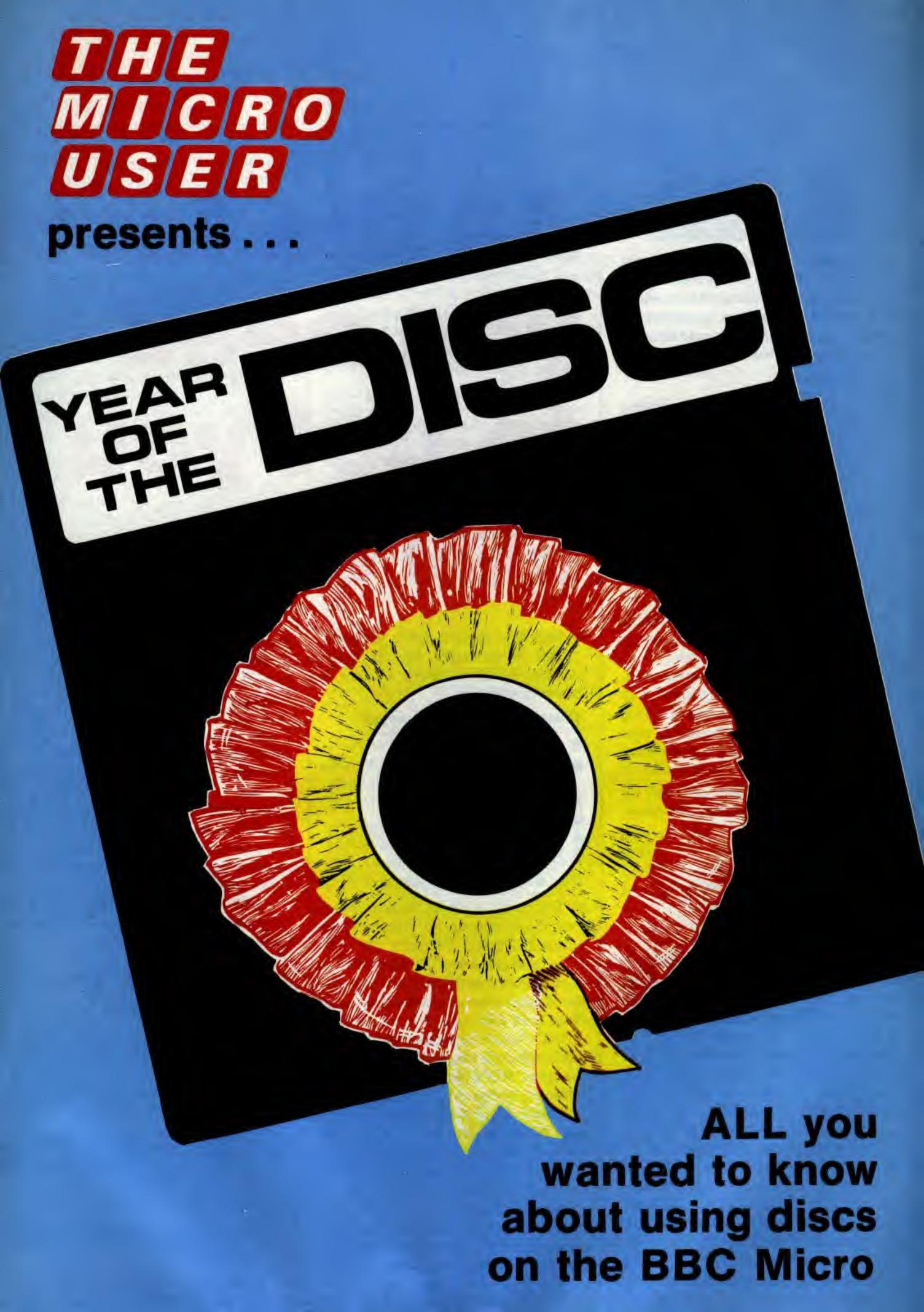
Seated at your computer, streams of multi-coloured aliens swirl past your laser-base into formation. The first squadron appears harmless, but later waves will avenge the deaths of their comrades with increasing ferocity. To combat the swooping bomb dropping meanies, you may try to link up a pair of laser-bases and **double your fire** power! Your progress through successive phases will be rewarded by challenge stages, where large bonuses may be earned. The game builds up to a dizzying crescendo of high speed motion where instant reflexes and pure technique are your only hope of survival. . .

One or two player game • Keyboard or joystick • Sound on or off • Escape facility
• Works on all OS's and Tubes • Ten name Hi-score table • Mode 2 full colour
graphics • Continuous rolling twinkling stars • Multiple missiles • Full screen
action • Attractively packaged in a collectable library case • High quality
cassette • Full instructions • For BBC model B or A + 32K •

Send cheques/P.O.s for £6.90 to

Aardvark Software, 100 Ardleigh Green Road, HORNCHURCH, Essex.

FRAK coming soon . . .



### JIM NOTMAN answers your basic questions

RECENTLY there has been a great increase in interest in discs and disc drives for the BBC Micro. Many owners feel that once they have mastered the cassette filing system they need to move on to something better.

#### Why use discs?

The most impressive feature of using any disc system is its speed. A program which could take many minutes to load from tape takes only a few seconds from disc.

Even if it is the last program that was put onto the disc it is found very quickly. Contrast that with a tape with several programs on it. It may take a considerable time to just find the program.

 Disc systems allow the more flexible use of files, like relative (random or direct) access files.

Tape files need to read from the start. Disc files can be read from or written to any position you like. Just as with a long playing record, you don't need to start from the beginning, but from the track you require.

- Disc systems load and save with far fewer errors than on the cassette system.
- Converting to discs may increase your use of the micro. It's rather offputting waiting 10 minutes to load some software from tape when you have only half an hour to spare.

#### Are there disadvantages?

- Cost is the main one. About £300 for the simplest system, though by keeping your eyes open (looking through The Micro User!) you may pay considerably less.
- The disc system reserves  $2\frac{3}{4}k$  of memory for its own use. In a cassette-only system, the memory from 3584 (&E00) is available for program use. In the Acorn disc system only the memory from 6400 (&1900) is free.
- Discs need to be looked after more carefully than cassettes as they are more vulnerable to damage. A fingerprint or a piece of cigarette ash could be all it takes to ruin a disc.
- Many software companies have been slow to issue their programs on disc.
   The excuse has been that there are not

# All the facts you need to get you started

enough disc users to make it viable.

This is no longer true, as a large number of BBC Micro owners are converting to disc.

#### What do I need to get started?

- Disc interface.
- Disc Filing System (DFS). This may come with the interface.
- Floppy disc drives.
- Connecting leads.
- Utilities disc.
- Blank discs.

#### Why do you need an interface?

• The interface can be thought of as an electronic translator which allows communication between the BBC Micro and disc drives. While most of the components cost only a few pence each, the floppy disc controller chip costs more than £40.

The Acorn interface includes the DFS, which is plugged into one of the sideways ROM sockets. It does not, however, come with a manual. The "official" BBC manual is only issued with BBC disc drives.

The standard interface is single density. This refers to how closely the information is packed on the disc.

At least two firms are working on a double density system (requiring a different floppy disc controller) which can put twice as much information onto a disc.

These systems need to have their own

special DFS to instruct the different disc controller. (This is not the same as having 40 or 80 track drives.)

#### Why do you need a filing system?

• Whenever the BBC Micro is switched off any programs or data that were in RAM are lost. If you want to keep any of this information it must be recorded in some way. File systems allow you to do this.

Since each method of saving the information is different, each must have its own filing system.

The DFS interprets any filing commands you give and carries them out without you having to know how it does it.

The operating system of the BBC Micro is arranged so that commands are not changed with filing system changes. Any command associated with filing is directed to the correct filing system.

Changing the file system is very easy:

For the DFS type in \*DISC (or

- □ For the DFS type in \*DISC (or \*DISK).
  □ For the tane system \*TAPE (for
- ☐ For the tape system \*TAPE (for 1200 baud), \*TAPE3 (for 300 baud).
- ☐ For the Econet system \*NET.

#### Will I have to learn a lot of new commands?

 All the commands that you learned for the cassette filing system will work equally well with the DFS.

In addition there are extra commands just for the DFS.

\*HELP (Return) gives a list of the paged ROMs that are in the BBC Micro.

\*HELP DFS (Return) lists the extra DFS commands, as illustrated in Figure

```
DFS 0.90

ACCESS (afsp) (L)

BACKUP (src drv) (dest drv)

COMPACT ((drv))

COPY (src drv) (dest drv) (afsp)

DELETE (fsp)

DESTROY (afsp)

DIR ((dir))

DRIVE ((drv))

ENABLE

INFO (afsp)

LIB ((dir))

RENAME (old fsp) (new fsp)

TITLE (title)

WIPE (afsp)
```

#### Figure I

Most of the commands manipulate program or data files that already exist.

\*RENAME for changing a files name, \*COPY and \*DELETE. \*TITLE allows the disc itself to be given a name.

\*DESTROY seems somewhat over dramatic, but is able to delete a number of files at the same time.

\*INFO gives information about the file like its load address and where the file is physically located on the disc.

As well as the main DFS commands there are a number of disc utilities. The commands are given by \*HELP UTILS, illustrated in Figure II.

```
DFS 0.90

BUILD (fsp)

DISC

DUMP (fsp)

LIST (fsp)

TYPE (fsp)
```

Figure II

DUMP gives the hexadecimal value and Ascii equivalent of each byte of a named file. This can be helpful if you like to see what is being put onto the disc.

Discs can be made far easier to use than tape. The DFS will look for a file called !BOOT when the Shift key is held down together with the Break key.

This allows programs to be loaded

and run - that is, if you've given the disc the correct instructions!

#### Are there other DFSs?

 There are a number of alternatives to the official Acorn 0.90 DFS. Watford Electronics and Amcom both produce their own.

One of the main problems with these others is software compatibility. This is especially true of software packages which employ software protection.

The main advice here is to ask the dealer whether the programs you buy are compatible with the DFS you have.

#### Why bother with alternative DFSs?

 They usually have a number of features in them which are lacking in the Acorn version, some of which are very useful.

For example, with the Acorn system only 31 different files can be held on one side of a disc. Several different DFSs increase this limit to about 60.

#### Can I copy my programs from tape to disc?

 With Basic programs this is very easy. Select the tape system with \*TAPE, LOAD the Basic program, select the disc system with \*DISC then SAVE the Basic program.

If this program is now too long because of the memory space the DFS has reserved for itself, move the program down in memory using the following:

```
1 *KEY O *TAPE:M NZ=PAGE-&EOO

: FOR LZ=PAGE TO TOP STEP 4

:!(LZ-NZ)=!LZ

: NEXT

: PAGE=&EOO:M OLD:M
```

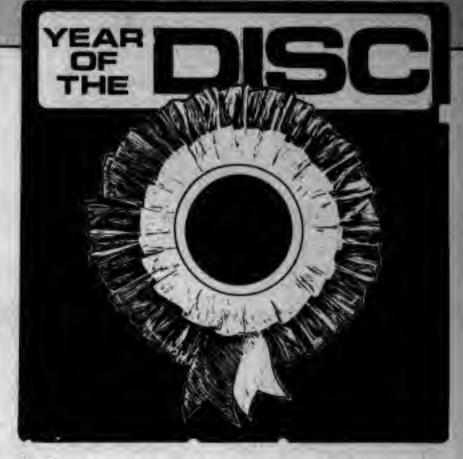
Machine code programs are a little more awkward. They must be put into exactly the same memory locations they would have occupied in the cassette system if they are to work correctly.

First switch to the tape system with \*TAPE. Now type in \*OPT1,2.

Looking at the program with \*CAT will give you the load address of the program, the execution address (where a machine code program is run from) and the length of the program.

Once these details are known the program may be loaded into memory above the area the DFS reserves, then moved to the memory locations it would have occupied with the tape system.

All that remains is to CALL the execution address.



Further details on transferring cassette programs to disc are given in the August issue of *Micro User*.

Not all programs can be copied easily, because many companies are now using some form of software protection.

#### I've heard of hard discs and floppy discs. What's the difference?

 Nearly all discs used with the BBC are floppy discs, so called because they are thin flexible discs of plastic coated with a magnetic recording emulsion.

Hard discs are much more sophisticated. A unit consists of a number of magnetic coated metal discs, mounted in a sealed unit and turned at high speed.

The reading and recording heads "float" a very small distance above the disc. Even very small particles of dust, human hairs or tobacco smoke may damage the discs if they come between the heads and the disc surface. Hence the sealed unit.

They are more expensive than floppies but can hold much more information, several megabytes rather than the hundreds of kilobytes the floppies have to offer.

A number of companies are working on hard discs for the BBC, though in several cases the software seems rudimentary. Hopefully this should be resolved shortly.

#### What sorts of floppy disc drives can you get?

• It is possible to use the BBC Micro with 8in floppy discs, a size associated more with larger or older computers.

More recently 3in micro floppies have started to appear, though there is more than one type of these. They are very compact and should prove popular, but at the moment there is little software written on them.

The commonest drives use the 5¼ in mini floppy disc. Whatever the size of drive, the information is written on it in circular tracks.

There are two main groups of disc drives, those having 40 tracks and those with 80.

The 80 track machines are more



#### Epson Fx 80 Printer

Including lead for BBC. Send £375 to include VAT, p&p.

#### 200K

40 Track Single & Double

#### Disk Drive

62 file names including cable and power lead. Send £175 to include VAT, p&p, inc. formatting disk & manual. 800K & 800K switchable with power supply available - ask for details.





#### 800K Disk Drives

£152

800K & 800K Switchable 124 file names including cable & power lead. Send £432 to include VAT, p&p. Send £460 for 800K Switchable.

#### Sanyo/BMC Monitors



12" amber or green screens. Send £99 to include VAT, p&p. £86



#### Diskettes

Memorex, in packs of 10 SS 40tk ..... £16.00 DS 40tk ..... £20.00 SS 80tk ..... £26.00 DS 80tk ..... £29.00

Including VAT, p&p.

#### JOIN THE BBC DISCOUNT CLUB

FOR THE KEENEST PRICES ON BBC COMPATIBLE PRODUCTS

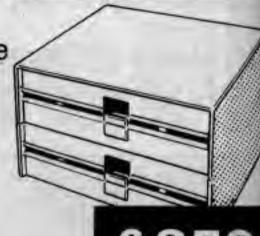
400K

80 Track Single & Double

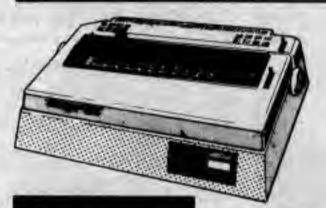
Disk Drives

Send for a full list

124 file names including all necessary leads. Send £299 to include VAT, p&p,



£259



inc. formatting disk & manual.

Juki Daisywheel Printer

£338

18 CPS including cable. Send £389 to include VAT, p&p.

Epson **Rx 80 FT** Printer



£260



Disk storage boxes ..... £15.00 (takes 35) Disk storage boxes ..... £20.00 (takes 80) Prices include VAT, p&p.

Accessories BBC Stands ..... £10.00 Dust covers ..... £4.95

(for BBC, Drives and Printers)



#### Qty. Product Price to Total members 200K DISK DRIVE □ £175.00 \_\_\_\_\_ £299.00 \_\_\_\_\_ 400K DISK DRIVES £375.00 \_\_\_\_\_ EPSON FX 80

800K DISK DRIVES \$432.00 \_\_\_\_\_ \$ \_\_\_\_ £460.00 \_\_\_\_\_ 800K SWITCHABLE £389.00 JUKI PRINTER SANYO/BMC-AMBER SANYO/BMC-GREEN £99.00 \_\_\_\_\_ EPSON RX 80 FT \$299.00 \_\_\_\_\_ SS 40 DISKETTES £16.00 \_\_\_\_\_ £20.00 \_\_\_\_\_ DS 40 DISKETTES SS 80 DISKETTES \$26.00 \_\_\_\_\_ £29.00 \_\_\_\_\_ DS 80 DISKETTES BBCSTAND

DUST COVERS

DISK STORAGE (35)

DISK STORAGE (80)

MEMBERSHIP APPLICATION FEE TOTAL SUM ENCLOSED (Cheque or credit card no.) &

£15.00

£20.00 \_\_

£10.00

To: The BBC DC, 46 Princes Avenue, Finchley, London N3.

I enclose my order for the above products at discount as a member of the BBC DC. I understand I will receive mailings of new products and special offers as they become available.

Name

Address \_\_\_\_

Signed.

I would like you to return my money if the goods ordered are not despatched within two weeks of receipt of order.

ALL PRODUCTS ARE BRAND NEW, BOXED AND OFFERED WITH FULL MANUFACTURERS WARRANTY. ALL QUERIES WILL BE ANSWERED BY MAIL.

expensive because their tracks are much narrower and therefore must be made more accurately. A 40 track disc can store 100k of information on one side, an 80 track disc 200k.

Some drives use only one side of the disc and are known as single sided. Others which use both sides are called double sided.

Then you may have a single drive or two drives in the same box. These are known as dual drives.

There is also a choice of having either a power supply from the BBC itself or having a separate supply in the drive unit. As there are a number of combinations the choice becomes bewildering.

#### Which disc drive should I get?

• For small business use you really need to use an 80 track system with dual

drives, preferably double sided.

For home use the main consideration will probably be cost. 40 track drives are perfectly adequate. Even the least expensive, a single sided, single 40 track drive is better than not having discs at all.

If you can afford dual drives you'll find them more useful, especially when using data files from different discs and file copying.

I prefer drives which have their own separate power supply as this leaves the power point on the BBC for other uses.

#### Do I need a utility disc?

 This will depend on which DFS you buy. To be able to use a new, blank disc it must be formatted.

This involves putting a number of magnetic marks on the disc so that the floppy disc controller knows where it can place or read data.

Some of the alternative DFSs have a



format command included in the DFS ROM – unlike the Acorn system where the format program is on a utility disc.

The other useful utility needed is VERIFY. This looks through the disc checking that it can be correctly read.

Apart from the basic utility disc, you may want some other utilities.

One that is particularly useful is a package which transfers tape programs onto a disc. Even many programs which are software protected can be transferred, though not all.

When you have spent hours punching in a program you want to be sure that it really is saved correctly on disc. MARK SMIDDY shows you how with his verify routine...

THE object of this verify routine is to check that the contents of a program file on disc (or tape) are exactly the same as the contents of memory. Or to put it another way, to check that the five hours of work you have just SAVEd will actually be what you typed in when you reload it.

The program, which is assembled at &1800, is suitable for use with model A or B with Acorn DFS or standard cassette, and is compatible with all operating systems.

After running the program you can call the verify routine by using CALL &1800. Of course, the program you wish to verify should be in memory!

Instructions showing how to save the assembled code are displayed when the program is run. It will remain resident during most filing operations, but it is wise to reload the assembled code whenever it is required.

Here's a full program description. In the following text A refers to the 6502 accumulator, X refers to the 6502 index register X, and Y refers to the 6502 index register Y.

The program can be split into five

# Verify what you SAVE, then you won't be sorry

main sections:

- 1. GET the filename.
- 2. Open a read only file.
- 3. Check the file byte by byte.
- 4. Close the file.
- 5. Output any messages.
- 1. This section uses the rarely used call OSWORD with A=0 to input a

string of Ascii characters of specified range up to a specified string length. The string input will be used as the filename.

The maximum string length is set to 7 in line 130, and should be changed to 10 if the utility is to be used with cassette.

2. This uses the OS call OSFIND



with A=&40 to open a file for read only. The file handle (the number assigned to it) will be returned in A and not in Y as is stated in the User Guide.

OSFIND returns with the zero flag set if no file could be opened.

- 3. This uses OSBGET to take each byte sequentially from the file and check to see if it is the same as the next byte in memory.
  - 4. OSFIND is used again to close the

file whose file handle is held in Y.

5. This outputs any messages using OSWRCH, starting at a point in the text pointed to by the X register.

Lines:

Initialise variables. 10-60

70-80 Output 'Input Filename' message.

Set up OSWORD parameter 90-180 block.

190-220 Set up X and Y and call OSWORD with A=0.

Jump out if ESCAPE is 230 pressed.

240-310 Initialise M/C variables, and call OSFIND with A=&40 to

open a file for read only.

320 Test to see if any file was opened.

Save file handle. 330

340-360 Get next byte from the file. Test for End Of File marker. 370

380-480 Compare with next byte in RAM and increment pointers.

490-520 Output End Of File error.

530-560 Output file not found message.

570-590 Output Verify error.

600-640 Close the file.

650-710 Output messages.

720-760 Make a BEEP.

770-820 Reserve some space for the OSWORD control block.

10 MODE 7 20 osword=&FFF1 :osfind=&FFCE :osbget=&FFD7 30 FOR NX=OTO 2STEP 2 40 PX=PAGE -256 COPTNZ . START 70 LDX #10 BO JSR message 90 LDA #(msg) NOD 256 100 STA block 110 LDA #(asg) DIV 256 120 STA block+1 130 LDA 47 140 STA block+2 150 LDA #33 160 STA block+3 170 LDA #126 180 STA block+4 190 LDX #(block) MOD 256 200 LDY #(block) DIV 256 210 LDA #0 220 JSR osword 230 BCS out 240 LDA #0 250 STA &70 260 LDA &18 \ =PAGE e.g. (&1900) 270 STA &71 280 LDA 8440 290 LDX #(msg) HOD 256 300 LDY @(esg) DIV 256 310 JSR osfind 320 BEQ error! \ No file error 330 STA 172

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

370 BCS error \ End of file

380 LDY 10 390 CMP (\$70),Y 400 BNE error2 \ Bad Byte error 410 LDA &70 420 CLC 430 ADC #1 440 STA 170 450 LDA &71 440 ADC 00 470 STA &71 480 JMP 1000 490 .error 500 LDX #25 510 JSR message 520 JMP close 530 .error1 540 LDX #28 550 JSR message 560 RTS 570 .error2 580 LDX #41 590 JSR message 600 .close 610 LDA #0 620 LDY \$72 630 JSR osfind

640 RTS

450 .sessage

660 LDA msg, X 670 CMP #13 680 BED out 690 JSR &FFEE 700 INX 710 JMP message 720 .out 730 JSR &FFE7 740 LDA #7 750 JSR &FFEE 760 RTS 770 .block 780 NOP 790 NOP BOO NOP 810 NOP 820 NOP 830 . 859 840 1 850 NEXT 860 \$P%= "" 870 \$(PZ+10)="Input Filename" 680 \$(PZ+25)="OK" 890 \$(P%+28)="No such file" 900 \$(PZ+41)="Verify error ?" 910 PRINT TAB(12,0) "VERIFY UTILITY" 920 PRINT TAB(8,2)\*(c) 1984 The Micro User" 930 PRINT TAB(12,4) by Mark Saiddy 940 PRINT "Call with" "CALL PAGE-256 "'"DR"'"CALL &";"PAGE -256 950 PRINT "SAVE H/C COPY WITH" "+SAVE ""VERM/C"" "; "PAGE -256; ";"PX+57

> This listing is included in this month's cassette tape offer. See order form on Page 169.

340 .1000

350 LDY 472

360 JSR osbget

## 

THE OUTSTANDING LINE ALL THE OUTSTANDING LINE OF THE OUTSTANDING LINE OUTSTANDING LINE OF THE OUTSTANDING LINE OUT

#### Complete Disk System for the BBC Model B

Package assumes you own a BBC Model B with switched-mode power supply plus 1.2 operating system

#### Offer includes:

- Disk Interface (call at factory for free fitting)
- 100k TEAC 55 Series Slimline Disk Drive including case and all leads
- **User Guide**
- Formatting Disk

Unit 7 Trumpers Way Hanwell W7 2QA

Telephone: (01) 843 9903

**DISK DRIVE** 

Trade out to VICILEN COMPUTER SUPPLIES

ON-THE Please send me (state number required) Post to Vicilian Computible Supplies it

THIS ADVERTISEMENT DESIGNED AND PRODUCED BY GMGRAPHICS.



SO you've finally got up the nerve and spent £300 on a DFS and disc drive. Now you've got them, how do you use them?

Well let's have the DFS come to your rescue. Type in \*HELP DFS, press Return, and you'll see Table I come up on the monitor.

These are the DFS commands that I'll be concentrating on in this article.

I'll be ignoring normal OS commands such as \*SPOOL and \*SAVE and refer you to the User Guide for explanations of them.

To return to the DFS commands, you'll notice that each of the capitalised keywords like DELETE and RENAME has one or more arguments following it.

An "argument" in this context is just an additional piece of information needed by the command, and not what happened when you explained to your dear ones how much it all cost.

They're fairly self explanatory and I'll deal with each as they come up.

For the present let's just take a disc that we've formatted (with the aid of the formatter that came with the DFS) and see how it is configured.

Put a disc (any disc at all) into DRIVE 0. If you've got double drives this is usually the left hand one. If you've only got one drive then DRIVE 0 is the one you've got.

Now enter \*CAT 0 and something like Figure I will appear on the display. I say "something like" because there is no

DFS 0.90

ACCESS (afsp) (L)

BACKUP (src drv) (dest drv)

COMPACT ((drv))

COPY (src drv) (dest drv) (afsp)

DELETE (fsp)

DESTROY (afsp)

DIR ((dir))

DRIVE ((drv))

ENABLE

INFO (afsp)

LIB ((dir))

REMANE (old fsp) (new fsp)

TITLE (title)

WIPE (afsp)

#### Table 1

#### NIGEL PETERS advises . . .

# How to use the DFS commands

guarantee that it will be identical.

However if it's a blank disc that's just been formatted it won't be too different, if at all.

What we now have is the catalogue of

(10)
Drive 0 Option 0 (off)
Directory :0.\$ Library :0.\$

Figure I

the disc which tells us how the disc is configured and what is on it.

The top left item is the name of the disc. At the moment it hasn't got one but we'll remedy that later.

"Drive" is straightforward. It's the number of the drive that the disc is in. "Option" and "Library" we'll leave until later, and for the present we'll concern ourselves with "Directory".

As you'll probably already know, you LOAD and SAVE on disc in just the same way you used to do on tape.

However, on disc you're confined to only 31 files. These can have names of up to seven letters, and it can be very frustrating trying to think up meaningful names for your programs.

You tend to end up with PROG1, PROG2, and so on.

The DFS gives you a way of collecting similar programs in groups in the form of directories.

A directory is merely a single letter (or the dollar sign) placed before the program name. In effect, this is an index letter and is used to group similar programs under one prefix.

To see what I mean, type in a program – anything at all – and save it on your newly formatted disc. If you

call it FRED and then \*CAT 0 you'll see that the program appears on the catalogue as in Figure II. And, even though it isn't shown, it has a directory symbol.

The reason that you don't see it is that it is the default directory that's in operation. This is the directory that prefixes all the program names with the dollar sign.

If you look at the catalogue heading you'll see that it tells you that the \$ directory is in operation.

Saving a program while that directory is in operation automatically gives it \$ as an index.

However it doesn't bother showing it in front of the filenames when you \*CAT. After all, the heading tells you that you're in the \$ directory - there's no need to repeat the information in front of every file.

If you wanted you could try

Option 0 (off)
Directory :0.\$

FRED

#### Figure II

LOADing \$.FRED. The DFS knows exactly what you mean and will do it, even though you only saved FRED. Similarly you could save another program \$.DICK and when you \*CAT 0 it will just be shown as DICK.

Now you're not stuck with that directory – you can save programs under any of the 27 available. You could, if you wanted, save another program A.DICK.

The micro won't mind that the name

is the same as the previous program you saved as the two programs are in different directories.

\*CAT 0 you get the A directory shown with the later DICK. The DFS always shows the directory of a file if it isn't the default directory.

We'll cover how to change the default directory later, but for the time being let's stick with \$. This is the one the DFS uses when you switch on, or after a Break.

Another default that you may have noticed if you have two drives is that when the micro is switched on or after Break is pressed it always goes to drive 0. This is the default drive.

If you want to work with drive 1 as the DFS's first choice then enter \*DRIVE 1. To go back to drive 0 enter \*DRIVE 0 or, more drastically, press Break.

Now that you know how to get to drive I you probably want to know how to catalogue it. As you might guess, you just enter \*CAT 1. If you're lazy like me you can use abbreviations.

To catalogue the disc in drive 0 you use \*.0 and for drive 1 you use \*.1 as you might have guessed. Just typing in \*. will catalogue the disc that's in the default drive.

So we've got our discs which we save to and load from in the usual manner. We can also see what files are on them and know about directories.

The trouble is that they get full up quite quickly as only 31 files are allowed.

How do we get rid of what we don't want?

Well, there are five ways of doing it, three intentionally and two unintentionally!

If you just want to get rid of a track you can use the \*DELETE command with the name of the track you want to get rid of. In the case of FRED you would enter \*DELETE FRED. This will delete the file straight away.

You could also use \*WIPE FRED to get rid of FRED. This gives you a safety margin in that it asks you whether you really want to get rid of FRED. Pressing anything other than Y results in FRED not being wiped.

Another feature that WIPE has which \*DELETE doesn't is that it allows the use of "wild cards". These allow you to substitute#or \* for parts of a file name.

If you then operate on that pseudo filename the DFS will supply all the filenames that fit the wild cards.

It's much easier to understand with an example. Try saving a few programs on disc with similar names such as PROG1, PROGTWO, PROGOFF.

\*DELETE or \*WIPE three times but using wild cards allows \*WIPE PROG\* to do it. The DFS will then question us for each filename, allowing us to select which files are erased and which remain.

As we've mentioned, there are two wild cards, # and \*. The hash sign, #, represents just one character of the file name while the star, \*, represents all the letters to the end of the file name.

Let's use a wild card to get rid of all the various PROGs. We enter \*WIPE PROG\*. The DFS will now go through all the PROGs on the disc and give us the option of wiping them.

As you can see from this the wild cards can save a lot of typing and time. You can use wild cards with any of the DFS commands in Table I that have afsp after them.

They also come in useful where there are several programs with the same name on different directories. Save some programs such as A.PROG, F.PROG, K.PROG. You get the choice of deleting them all with \*WIPE #.PROG.

In other words, we've used a wild card to represent the directory letter. If you want to take this to its limit then try \*WIPE #.\* and see what happens.

As if all this isn't enough there is yet another way to get rid of unwanted files. This is the use of \*DESTROY.

You use \*DESTROY when you want to get rid of a group of files such as the PROGs we met before. What you do is type in \*ENABLE (which is a sort of safety catch) and then enter \*DESTROY PROG\*. If you make a mistake then you have to \*ENABLE again before the DFS will allow you to \*DESTROY.

Using \*DESTROY with a wild card will result in the DFS listing all the files on the disc that fit the bill and asking "Delete Y/N". If you answer "Y" then the lot will go.

This is in contrast to \*WIPE with a wild card which gives you the erase option on each file.

With \*DESTROY it's all too easy to get rid of a wanted file along with the unwanted ones. For this reason I stick to \*WIPE. I still make mistakes, though!

As mentioned previously there are two other ways you can get rid of files on a disc and it nearly always happens when you don't want it to.

The first is to format the disc. This will destroy all the files on it.

The second is to use the \*BACKUP command which produces a duplicate of a disc. To do this you use \*ENABLE (the safety catch) and then \*BACKUP followed by the appropriate drive numbers.

If you were copying the disc on drive 0 to the disc on drive 1 you would enter \*BACKUP 0 1. If you just have a single disc drive you would use \*BACKUP 0 0 and the DFS will prompt you when to put in the source disc and the destination disc.

The trouble with \*BACKUP is that if you're careless and mix up the source and destination discs you can end up with a perfect copy of a blank disc.

Also this command can use part of the micro's memory and cause you to lose whatever was in it – usually a vital Wordwise file in my case.

A milder form of \*BACKUP is \*COPY, which is used to copy a file from one disc to another. \*BACKUP copies everything from one disc to another whereas \*COPY only makes a copy of one file.

It can however use the micro's memory so, as with \*BACKUP, beware if you've got anything important in it.

\*COPY is simple to use. To create a copy of FRED you just use something like \*COPY 0 1 FRED which copies the file FRED, which is on the disc in drive 0, to the disc in drive 1.

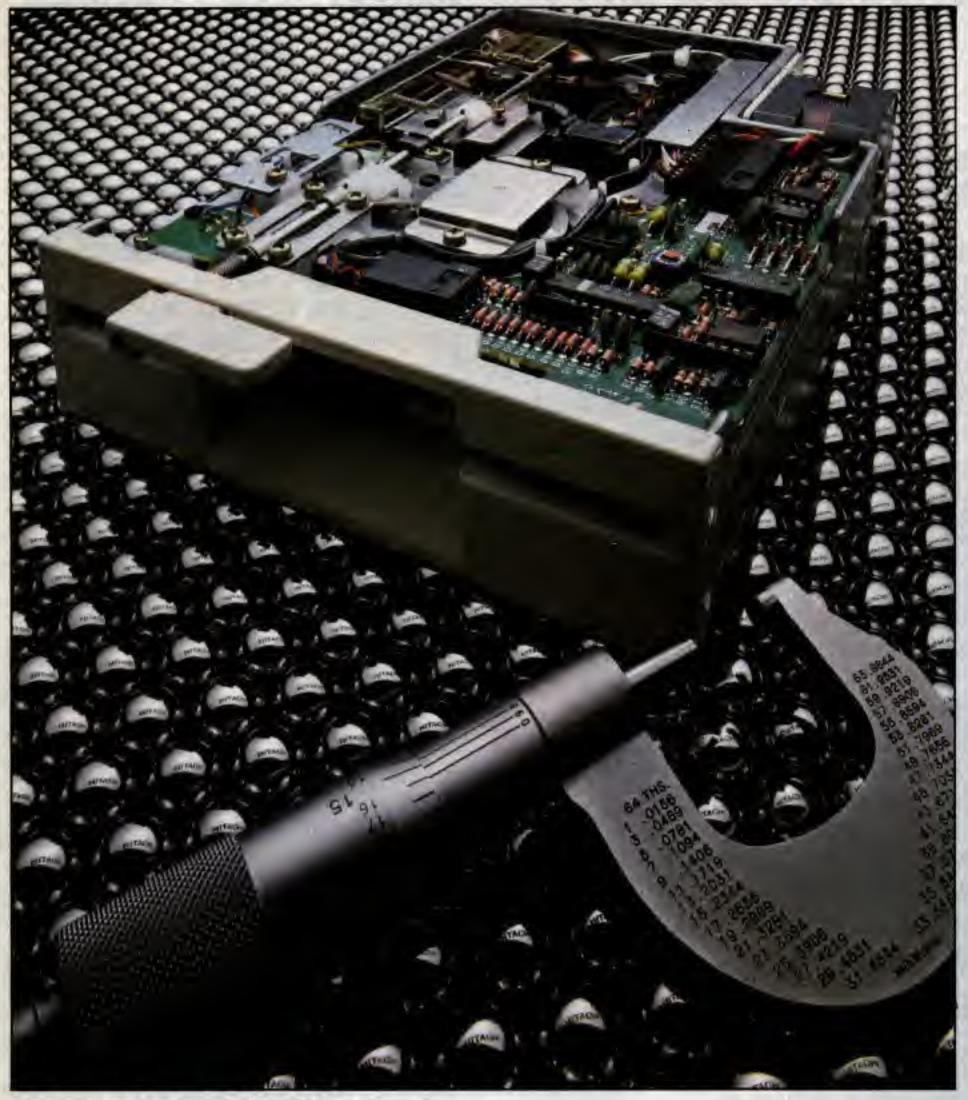
As it only copies FRED, not deleting the original, you end up with two FREDs, one on each disc.

If you only have one drive then \*COPY 0 0 FRED will do the job for you, the micro prompting you when you have to put in the appropriate disc.

Having told you all these ways of destroying files, you might wonder if there was any way of protecting them, as they do seem rather vulnerable.

The obvious way is to put a write protect tab over the notch on the disc. This will physically stop the DFS altering the disc. The trouble is that it's not selective, all the files on the disc

## HI-TECH MEANS HITACHI.



If you thought that all Floppy Disc Drives were alike - you'd be mistaken.

The HITACHI range stands out

- \* High in reliability
- \* Technically advanced
- \* Fully compatible with BBC Units.
- 5¼" All 5¼" drives are half height and have an access track of 3 or 5 ms.
- 3" Amazing new 3" drive with hard case diskette, fast 3 ms track to track.

#### All drives have a 12 month warranty.

Code	(Uncased)	Price inc VAT
HF001	3" single sided 100/200K	178.25
HF002	3" double sided 200K	195.50
HF004	5¼" double sided 200K	201.25
HF 005	5¼" double sided 400K	224.25
	(Cased with leads	120,700
	& Utility discs)	
HF008	3" single sided 100K	212.75
HF 009	3" double sided 200K	258.75
HF010	5¼" double sided 200K	252.65
HF011	5¼" double sided 400K	296.75
HF020	Separate leads (per set)	16.10
HF021	Separate metal case 3"	9.00
HF 022	Separate metal case 51/4"	9.00
HF025	3" diskettes	4.95 each
	(Cases match the BBC)	

Dealer enquiries welcome and Quantity prices available, All goods sent overnight carrier (add £6 to order for drives. Add £2 to order for leads or cases).

#### ALSO AVAILABLE FROM:

Made with you in mind.

RMK Electronics Limited Hinton House New Milton Hants (0425) 616110

Micro Choice 159 Havant Road Drayton Portsmouth Hampshire (0705) 324934 Silicon Valley Computer Centre Suite 104-105 16 Baldwins Gardens Holborn London (01) 242 2803 Wiltshire Microcentre
Unit 6 General Trading Estate
Signal Way
Swindon, Wilts SN3 1PD
(0793) 612299

#### ORDER FORM

CODE	QUANTITY	PRICE
HF001		
HF002		
HF004		
HF005		
HF 008		
HF 009		
HF010		
HF011		
HF020		
HF021		
HF022		
HF025		

Add Carriage

Total

To: GSL Computing Ltd., 2 North Way, Andover, Hants SP10 5AZ.

Name	
Address	
Phone No	
I enclose cheque/PO	for £
Signature	
	2 North Way Andover, Hants SP10 5AZ (0264) 59633

## 盟B DISC DRIVES

### CHASE DATA LTD

The exclusive disc drive company, cut out the middle man to bring you BEST PRICES on CANON disc drives.

1YEAR
WARRANTY
ALL PARTS
& LABOUR

110/210 DUAL DRIVES YSTEM

221 DUAL DRIVES YSTEM

CHASE DATA LTD are pleased to annouce the launch of the latest generation of Canon disc drives — the ultra slim model 221 (double sided 80 track) — TRULY SUPERB VALUE FOR MONEY

All inclusive means

Disc drive + case + all power and data cables + U.K. carriage + utilities disc & manual + V.A.T.

Quality product

State of the art disc drives. E.g. Model 221 features: unique on-board switching that both reads and writes in 40/80 TK modes

Full service support

Our units come with a full 1 year warranty on parts & labour. Disc drive service is via the leading U.K. Independent Drive Service Company.

Send remittance (Cheque only please) with your order to:

CHASE DATA LTD

P.O. Box 6, Woking, Surrey GU214PB. (Tel: 0784 38487).

#### All inclusive price list

MODEL 110 210 221

**FORMATTED** 

CAPACITY OF SINGLE DRIVE

ON BBC MICRO 100K 200K 400K

SINGLE DRIVE

IN CABINET £170 £198 £236

**DUAL DRIVE** 

IN CABINET £320 £370 £437

All units available with on-board power supply.

Additional cost: £25.

Now you can add the very latest 51/4 inch, half height disk drives from TEAC to your BBC Model 'B'.

#### SINGLE DRIVES

FD-55A-9409, 100KB, 40 TRACK S.S. £182 FD-55B-9410, 200KB, 40 TRACK D.S. £234 FD-55E-9411, 200KB, 80 TRACK S.S. £217 FD-55F-9412, 400KB, 80 TRACK D.S. £258

Powered by the BBC Micro; no additional power supply needed.



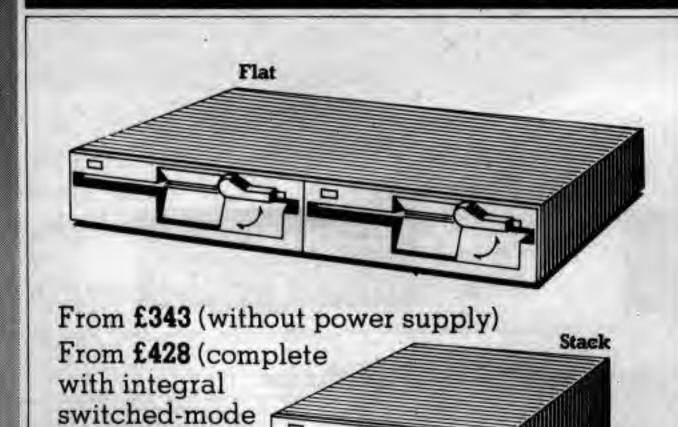
#### **FEATURES**

- ☐ LSI Circuitry
- ☐ Fewer mechanical parts
- Lower power consumption (4.9W)
- Metal case minimises RFI
- 12 Months warranty
- All cables supplied

#### ALSO AVAILABLE

Enquire for full details of our range of TEAC Twin Drives.

#### TWIN DRIVES



ORDERING

To order, add VAT to above prices

power supply)

and send your remittance. Alternatively, order by telephone quoting your Barclaycard/Access number. Carriage and packing free.

Enquiries from Dealers and Education Authorities welcomed.

2a Green Street Sandbach Cheshire CWII 9AX



MAIL ORDER MICROS

Telephone 0782 811711

#### CARSON DEVELOPMENTS

New stocks arrived Previous offer now repeated

**FULL HEIGHT 40 TRACK DISC DRIVES CASED & CABLED FOR £100** 

#### DISKETTES

40 Trk SS.SD	WABASH £14.00	DATALIFE	VEREX £14.00
40 Trk SS.DD		£17.00	
40 Trk DS.DD	£17.50	£24.00	-
80 Trk DS.DD	£23.00	£28.00	

£1 post and packing; 3 or more boxes are post free; discount on quantity.

DISC INTERFACE KITS: Single density £85; double density £99; double density DFS £79.

#### DISC DRIVES

		Cased	Dual cased
	Bare	and cabled	and cabled
40 Trk SS	£125	£140	£280
40 Trk DS	£155	£170	£340
80 Trk DS	£210	£215	£400
Power supply	at £35	and Colored to	

Please add VAT to all prices.

Format disc and user guide £5. Carriage on drives £10.

Dealer enquiries invited.

CARSON DEVELOPMENTS (MU) 84 Highfield Road, Romford, Essex, RM5 3RU.

Telephone: 0708 27043



#### Philips Video Display TP 200

#### DESCRIPTION

The monochrome Video terminal TP 200 is intended for use as a computer data display suitable for connection to a wide range of equipment. Applications include:

- personal computers
- business computers
- control systems
- automatic test equipment. The picture quality of the

TP 200 means that not only 80 column × 24 lines of information can be displayed but the monitor may also be used for high resolution graphics. » Designed in» reliability

and Philips quality assurance combine to provide long term trouble free definition performance.

**PRICE £69.95** 

+ VAT and £6 delivery (lead £3.20)

#### K N DEVELOPMENTS

20 Harebell Close, Shawclough, Rochdale

Tel: Rochdale (0706) 43869

being shielded whether or not they are important.

To get around this the DFS has the \*ACCESS command which allows you to lock a file. Suppose you had a file HARRY that you didn't want deleted. You could lock it with \*ACCESS HARRY L and then \*DELETE, \*DESTROY and \*WIPE won't touch it.

Sadly it won't protect against formatting and \*BACKUP.

\*ACCESS HARRY, that is, you leave off the L. You'll see from the DFS command list that \*ACCESS can be used with wild cards. \*ACCESS \*.\* L will lock a whole disc. As you might guess \*ACCESS \*.\* will unlock every file on a disc.

Locking a file will also stop you from renaming it with the self explanatory \*RENAME.

If we wanted to rename a locked file HARRY with the new name TOM we would have to unlock it with \*ACCESS HARRY then use \*RENAME HARRY TOM.

It's quite simple to use and can help keep discs tidy and orderly.

You might have found, with all these programs going on your disc, that you've been running out of room to store things.

One way around this is to \*COMPACT the disc. This tidies it up and releases extra space for new files.

To compact the disc on drive 0 you use \*COMPACT 0. While this is happening the DFS displays the information about each file's structure.

Beware though, for like \*BACKUP and \*COPY, \*COMPACT can corrupt what is already in the micro's memory.

The information displayed for all the files when you \*COMPACT can also be gained by using \*INFO.

To get the information about a file HARRY you just use \*INFO HARRY

\$. HARRY L FF1900 FF8023 00000D 003

#### Figure III

and the display will tell you whether the file is locked, its load and starting addresses and its length. Figure III shows how it's displayed.

During the normal course of events the DFS won't display this information about a file. You can, however change this by entering \*OPT 1 1.

Now the file details will be displayed everytime it is used, rather like an automatic \*INFO. To stop this just enter \*OPT 1 0 and things return to normal.

To finish this tour of the DFS commands let's take a look at the catalogue again by entering \*CAT (as my tabby is known).

Remember I said we could give a disc a name. To do this we use \*TITLE. The name can be up to 12 letters long.

To name the disc in the current default drive EXAMPLE all we do is type in \*TITLE "EXAMPLE" and press Return. Now enter \*. and you'll see the name.

I also said that we could change the default directory of a disc. Usually it's \$ but if we wanted (for reasons best known to ourselves) to change it to A we would enter \*DIR A which makes the default directory A. Any programs we now save onto the disc will have the

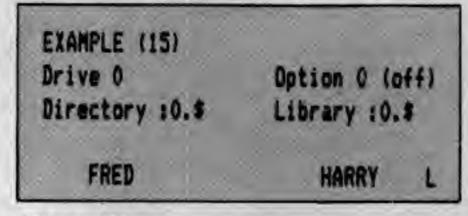


Figure IV

directory A (unless we do something about it).

\*CAT. This is because the default directory never does. What does happen is that files which were saved when \$ was the default directory magically appear with \$. in front of them when you \*CAT after a change of directory.

Figure IV shows the catalogue of a disc named EXAMPLE. The default directory is \$, the usual one after switching on or pressing Break.

Figure V shows the result of changing the default directory to X with \*DIR X and saving a couple of more programs. You'll see that the previous programs now show their \$ directory.

The programs recorded under the new default, X, don't show their directory.

Now try entering another default directory, say \*DIR Z, and you'll see the files with both \$ and X directories as in Figure VI.

The point to remember is that the proper name of each file always includes the directory it was saved under. It just



so happens that if it is the default directory it doesn't appear on the catalogue.

As you've seen, we can have files on

EXAMPLE (17) Drive 0 Directory :0.X	Option 0 (off Library :0.\$	1
DICK	TON	
\$.FRED	\$.HARRY	L

Figure V

the disc with different directories and we can save and load programs with their full name such as A.PROG1 or \$.PROG2.

In fact, if the default directory of a disc is different from the directory of the file we want to load, we have to give it its full name or the DFS says it's not on the disc.

If you don't follow that then try saving a program A.GEORGE on a disc where \$ is the default. Now try to load GEORGE from that disc and see where you get!

It's not only the directory that you can specify in a filename. You can even choose a drive.

You do this by putting the drive number at the beginning of a filename but after a colon which tells the DFS that the number following specifies a drive.

If you wanted to save a program EILEEN on the disc on drive I with the

Drive 0 Directory : 0.2		Option 0 (off) Library 10.\$	
\$.FRED X.DICK		\$. HARRY X. TON	£

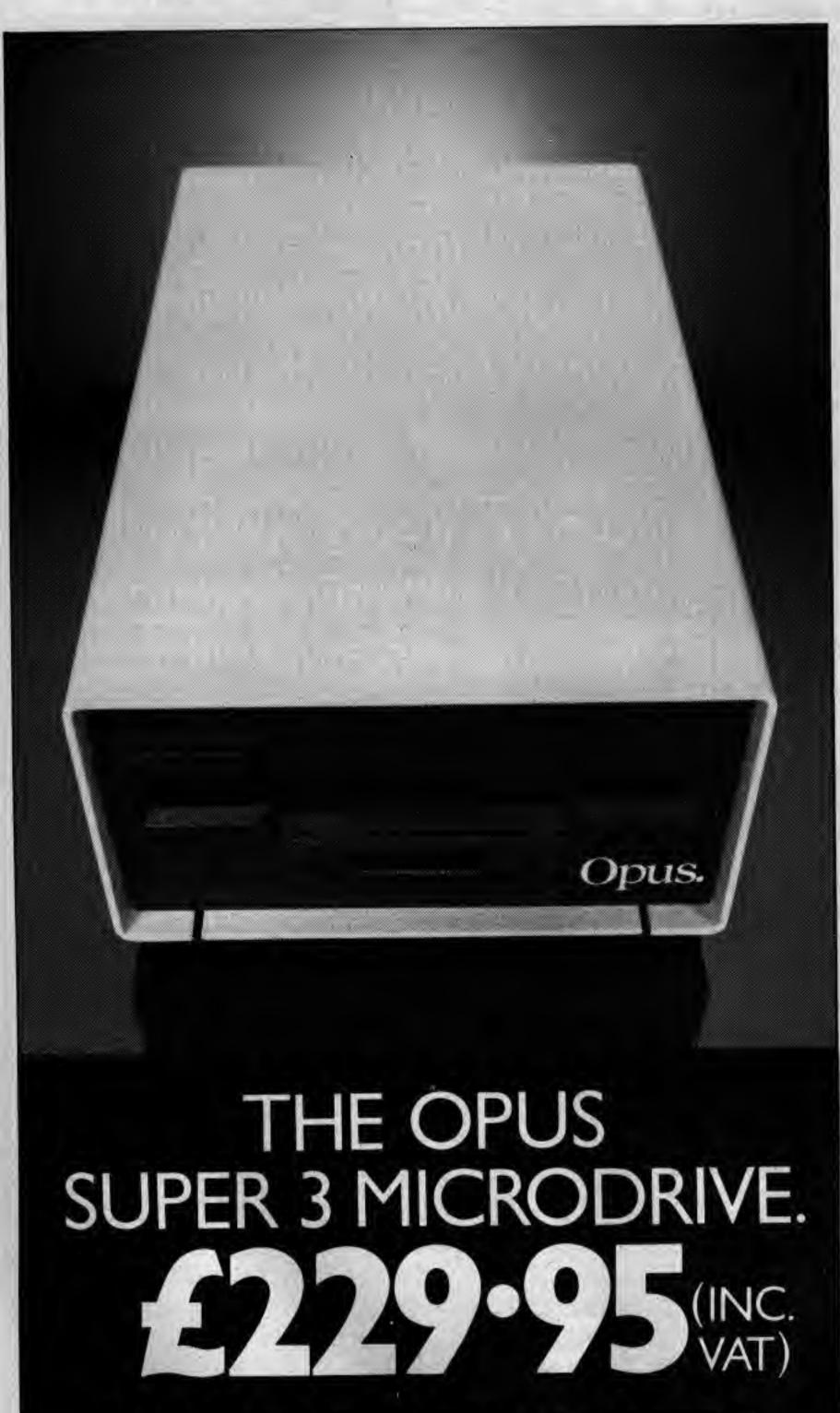
Figure VI

directory A then you would SAVE ":1.A.EILEEN". Try it and see.

The good thing about this is that you can use the non-default drive without having to type in \*DRIVE 1 and

- Turn to Page 99

## A DOUBLE-SIDED 3" DISC DRIVE AT A SINGULAR PRICE.



FOR USE WITH YOUR BBC MICRO.

For only £229.95 (and that includes VAT, and all the necessary leads) you can have an OPUS 500k double-sided disc drive. And remember 3" disc drives are fast becoming the standard for home and business use.

This is an even bigger bargain than it sounds. For you're getting a double sided drive at the price that other company's sell single sided drives for. It reads and writes to the disc cartridge from both sides, giving you twice the on-line capability of other 3" drives., And there's no need to flip the disc over!

#### STATE OF THE ART TECHNOLOGY FEATURING:

- Easy to connect to the BBC Micro
- · Compatible with most other makes
- Comprehensive manual
- Free disc cartridge
- Format, verify and other utilities provided
- Direct Drive
- Double sided
- One touch cartridge load
- 3 ms access time
- Portable, compact and reliable
- One years full guarantee
- vided Totally compatible with 5¼" drives

#### TECHNICAL PERFORMANCE.

	Single Density	Double Density
Capacity	250K Bytes	500K Bytes
Recording density	4,915 BP1	9,830 BP1
Track density	100 TP1	100 TP1
Total number of tracks	40 (each side)	40 (each side)
Recording method	FM	MFM
Rotational speed	300 RPM	300 RPM
Transfer rate	125K Bits/Sec	250K Bits/Sec
Access time track to track	3 ms	3 ms
Access time settling	20 ms	20 ms
Motor start time	0.5 sec	0.5 sec

The Opus Super 3 Microdrive is now available from W. H. Smith's and leading specialist shops.

Dual disc drives are also available for £460.

9.00-1.30p.m. Saturday.

#### OPUS SUPPLIES LTD.

158 Camberwell Road, London SE5 0EE. Opening hours: 9.00-6.00 Monday-Friday,

01-701 8668 01-703 6155

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Please rush me the following: (ALL PRICES INCLUDE VAT & CARRIAGE.)

Quantity	Description	Price
	Single drive(s) at £229.95 ea.	
	Dual drive(s) at £459.95 ea.	
	TOTAL	100

1 enclose a cheque for &\_

Address

Telephone

Or please debit my credit card account with

Name \_\_\_\_\_

Opus Supplies Ltd

## Drives of the future



Now available for the BBC Microcomputer, this superb range of high performance, low profile disc drives which give more data storage, and use less space.

The Pace range of drives include drives which are switchable between 40 and 80 tracks. As these drives are double sided they give a massive 400 k per drive in 80 track mode, whilst in 40 track mode they retain compatibility with Acornsoft and other

commercially available software. These drives feature colour LED's to indicate operation.

All Pace drives are capable of being used as double density drives so that, as and when, a double density filing system and interface become available, the disc storage capacity will be doubled (eg. the dual 40/80 drive will have an unbelieveable 1.6m of storage).

Pace disc drives are designed to run off the BBC power supply and are supplied complete with all cables, a utilities disc and manual.



92 NEW CROSS STREET, Bradford BD5 8BS. Tel: (0274) 729306

Telex: 51564 SHAREY-133





Dealer enquiries welcome

#### Disc drives available:-

Single Sided 40 80 Track | 400k

SING	LE DRIVES	VAT	inc VAT
PSD1	Single Sided 40 Track (100k)	£185	£212.75
PSD2	Double Sided 40 Track (200k)	£235	£270.25
PSD3	Double Sided 40 80 Track (400k)	£305	£350.75
PSD4	Double Sided 80 Track Only (400k)	£285	£327.75
PSD5	Single Sided 40-80 Track (200k)	£235	£270.25
DUAL	DRIVES		
PDD1	Single Sided 40 Track (200k)	£338	£388.70
PDD2	Double Sided 40 Track (400k)	£449	£516.35
PDD3	Double Sided 40 80 Track (800k)	€579	£665.85
PDD4	Double Sided 80 Track Only (800k)	£538	£618.70

£5.6.35

Available from good computer stores everywhere including:

Computer City, Widnes, Cheshire, Tel: 051-420-3333. Computerama, Stafford Tel: 0785-41899. Silcon Centre, Edinburgh, Tel: 031-557-4546. Computerama, Stoke on Trent, Tel: 0782-268620. G.T.M., Leeds, Tel: 0532-647474. Wilding Computer Centre, Wigan, Tel: 0942-44382. National Micro Centre, Stockport, Tel: 061-483-3605. Sir Computers, Cardiff, Tel: 0222-21341. P.J. Microsystems, Crowthorne, Tel: 0344-772351.

## The Micro User upavailable for the BB survey of disc drive to-the-minute Micro

TOPA MARIAN

Computer	Chagas Data	Cerson Develop ments	Advanced Memory Systems	Supplier
40 40/80 40/80	40/80 40/80 40/80	844846	40	Tracks
100k 200k 400k	100k 200k 200k 200k 200k 400k 400k 800k	100k 200k 800k 400k 800k	200k	Capacity
Single Single Double	Single Single Single Single Double Double Double Double Double Double	Single Double Double Single Double Double	Double Double	Single or Double sided
3 8 8 8	Yes Yes Yes Yes	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	No No	Integral
Single Dual Single	Single Single Dual Single Single Single Dual Dual Dual	Single Single Single Dual Dual	Single	Single or Dual
£168 £295 £230	£148 £170 £278 £300 £172 £194 £322 £343 £205 £227 £380 £402	£140 £170 £220 £280 £340 £400	£195.65 £346.95	Price (ex VAT)
258x59x152 258x89x152 258x47x152 258x47x152	146x57x196 146x57x196 146x57x196 146x57x196 146x57x196 146x57x196 146x57x196 146x57x196 146x33.5x215 146x33.5x215 146x33.5x215 146x33.5x215	218x43x147 218x43x147 218x43x147 218x125x147 218x125x147 218x125x147 218x125x147 218x125x147	90x40x150 180x40x160	Size LxHxW (mm)
Shugart Shugart Shugart	Canon	Tandon Tandon Tandon Tandon Tandon Tandon Tandon Tandon Tandon	Hitachi 3" drive	Drive

	Pace	Opus	Oakleaf	SHIETEAS	Supplier
40/80 40/80 80	666	40/80 40/80 40/80 80	80 440	40/80 40/80 40	Tracks
200k 100/200 100/200 400k 400k	100k	100k 2×100k 200k 2×200k 400k 2×400k 2×200k 400k 2×200k 2×400k	100k 100k 200k 800k	800k 400k 200k	Capacity
Double Single Single Double	Single Single	Single Single Double Double Double Double Double Double	Single Single Single Double	Double Double Double	Single or Double sided
22222	N N N	Yes Yes Yes	N 0 0 0	Yes Yes No	mtegra PSU
Dual Single Dual Single	Single Dual Single	Single Dual Single Dual Single Dual Single** Dual** Dual**	Single S/expandable Dual Dual	Dual Single Single	Single or Dual
£449 £235 £449 £285	£185 £338 £235	£149.48 £323.39 £192.95 £392.95 £514.69 £192.95 £392.95 £392.95 £219.04 £427.73	£163 £163 £260 £500	£399 £233 £159	Price (ex VAT)
	218x43x147 218x86x147 218x43x147	229x44x152 305x88x152 229x44x152 305x88x152 229x44x152 305x88x152 178x38x83 178x38x83 178x44x190 229x44x152 305x88x152	218x51x147 218x102x147 218x102x147 218x83x147	419x51x375 419x51x375 254x51x146	Size LxHxW (mm)
TEAC TEAC	TEAC/TEC TEAC/TEC TEAC	Various	Shugart (Chinon) Shugart (Chinon) Shugart (Chinon) Shugart (Chinon)	Toshiba Toshiba Seiko	Drive type

\*Opt = optional integral PSU = £35 | Opt = optional integral PSU = £35 | NOT including formatting diskette, drive connecting cable and user manual. 40/80 means the drive is switchable between 40 and 80 tracks

40 40/80 40/80 80 80	80	40 40 40/80 40/80 40/80	40/80 40/80 40/80 80 80 40/80 40/80	04	04 04 04 04 04 04 04 04 04 04 04 04 04 0	40/80 40/80 40/80 40/80	40 80 40/80	40/80 40/80 80 80 80 80
Foothing- madic	Torch	Twillstar			Negative Control of the Control of t		Walter	Werford
			The same of				-	
TEC TEC TEC TEC TEC	Mitsubishi	Mitsubishi TEC TEC Mitsubishi TEC Mitsubishi	Shugart Shugart or TEAC Shugart or TEAC Shugart or TEAC Shugart or TEAC Cumana Hitachi 3" drive	Hitachi Nat. Panasonic	TEAC TEAC TEAC TEAC TEAC TEAC TEAC TEAC	Shugart Shugart Shugart Shugart 3" drive	Shugart (Chinon) Shugart (Chinon) Shugart (Chinon)	Mitsubishi Shugart (Chinon) Shugart (Chinon) Shugart (Chinon) Mitsubishi Mitsubishi
241x51x152 312x51x152 312x51x152 241x51x152 312x51x152 312x51x152	241x51x152 312x51x152	312x51x152 312x51x152 312x51x152 312x51x152 300x125x200 300x125x200	216x64x146 216x128x146 229x38x146 229x76x146 229x76x146 229x76x146 279x38x146 279x38x146 279x38x146 279x38x146 279x38x146	124x73.5x152		305x76x127 305x76x127 305x76x127 305x76x127 210x83x146 210x83x146	218x43x147 218x43x294 218x43x294	218x43x294 218x43x294 218x43x147 218x43x294 218x43x294 218x43x294 218x43x294 218x43x294
£185 £199 £185 £214 £229 £213	£245	£249 £345 £389 £469 £469 £525	£149.95 £298 £240 £480 £480 £280 £191 £180 £360	£167.28		£230.43 £338.26 £359.57 £499 £129.57 £216.53	£153 £160 £291	£264 £479 £173 £180 £311 £284 £499
Single Single Single Single Single	Single	Single Dual Dual Dual Dual	Single Dual Single Dual Single Single Single Dual	Single Power supply	Single Single Single Single Single Single Dual Dual Dual Dual	Single Dual Dual Single Dual	Single S/expandable Dual	S/expandable Dual Single S/expandable Dual S/expandable Dual
No Yes	No.	Yes Yes Yes Yes Yes	No on	No	No Yes No Yes No Yes No Yes No Yes	No N	0 0 0 0 0 0 0	No Yes Yes Yes Yes
Single Single Single Single	Double	Single Single Single Single Single	Single Single Single Double Double Double Double	Double	Single Single Double Single Single Single Single Single Single Single Double Double Double	Single Single Double Single	Single Single Single	Single Single Single Single Single
100k 100k 100k 200k 200k	400k	400k 2×100k 2×200k 2×400k 2×400k 2×400k	100k 200k 200k 200k 400k 100k 100k	2×100k	100k 200k 200k 2x100k 2x200k 2x400k 2x400k 2x400k	100k 400k 100k	100 t 90 t	400 100 4 4 6 6 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6
044488 00000000000000000000000000000000	200	80 80 40/80 40/80	0408888044	40	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	344 44	544	40/80 40/80 40/80 40/80
Cumene			189	LT.L Certhmill	Keydee	LVI. Milcro Rascurces	Midwidth	

		ਵਵਵਵ			
TEAC TEAC TEAC Mitsubishi Mitsubishi	Mitsubishi	TEAC TEAC TEAC TEAC TEAC TEAC TEAC TEAC	TEAC TEAC TEAC TEAC Canon Canon Canon Canon Canon Canon	TEAC TEAC TEAC	TEAC Mitsubishi Mitsubishi Mitsubishi Mitsubishi Mitsubishi Mitsubishi
254x44x152 279x121x229 254x44x152 279x121x229 254x44x152 279x121x229	415×70×370	New Slimline	235x46x150 295x46x150 235x92x150 235x92x150 235x46x150 235x46x150 235x46x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 235x92x150 20 mm high 70 mm high 70 mm high 70 mm high 70 mm high 70 mm high	218x43x147 218x43x147 218x43x147	Slimline Slimline Slimline Slimline Slimline
£150 £320 £180 £195 £195	£730†	£146.95 £181.95 £286.95 £321.95 £321.95 £191.30 £226.30 £233.91 £268.91 £268.91 £268.91 £268.91 £268.91 £268.91 £268.91 £268.91 £268.91 £268.95 £268.95 £268.95 £333.95 £333.95	£139.20 £167.20 £278.40 £278.40 £200 £228 £428 £173 £201 £374 £217.39 £217.39 £462.78 £160.86 £188.86 £160.86 £188.86 £349.72 £200 £228 £3399 £239	£181 £299 £309	£139 £188 £215 £375 £385 £275 £499
Single Dual Single Single Dual	Dual	Single Single Dual Single Single Single Single Dual Single Single Dual Single Dual Single Dual Dual Dual Dual Dual Dual	Single	Single Single Single	Single Single Single Dual Single Dual
Yes Yes Yes	Yes	Yes	Yes	No on	No No No No Yes
Single Single Single Double	Double	Single Single Single Single Single Single Double Double Double Double Single Single Single Single Single Single Single	Single Single Single Double	Single Double Double	Single Double Double Double Double Double
2×100k 2×100k 2×200k 1×400k 2×400k	400k	20000000000000000000000000000000000000	100k 200k 200k 200k 200k 400k 400k 400k 4	100k 400k 200/400	100k 400k 800k 800k 400k
40/80 40/80 80 80	80	04 04 04 04 04 04 04 04 04 04 04 04 04 0	4 4 4 4 4 4 4 4 4 6 4 6 4 6 4 6 4 6 4 6	40 80 40/80	40/80 40/80 40/80 80 80
	oreh	villetar	glen	Valtera	Verticord

t Including 280 and power supply and CP/M and software

<sup>★</sup> Plus full range of Cumana drives \*\* 3" drives

#### mw systems offer you

### A FULL RANGE OF FLOPPY DISC SYSTEMS FOR THE BBC MICRO

- Disc Drive Units are cased in high quality steel boxes, finished in a matching BBC colour.
- All Units come complete with manual, formatting disc and appropriate cables.
- Optional Power supply available for Dual 400K.
- All Single Units can be upgraded to a double unit.
- All Equipment is covered by a full 1 year warranty.



MWS 800K (1.6MB) at Double Density.
DUAL DRIVES from Toshiba.
These drives are double sided/double
density and are 40/80 Track Switchable.



A SINGLE DRIVE from SEIKO.

This drive is double sided/single density.



MWS 400K (800K at Double Density). SINGLE DRIVE from TOSHIBA.
This drive is also double sided/double density and is 40/80 Track Switchable.

#### mw systems Itd.

Matrix House Lincoln Road Cressex Industrial Est. High Wycombe Bucks Tel (0494) 450341

#### ORDER FORM

All prices are exclusive of VAT All Systems are ex-stock and are despatched by next day delivery service

Please send me the following item:	S	Quantity	£
Dual 400K Drive Unit (800K)	at £399		
Single 400K Drive Unit	at £233		
Single 400K Upgrade	at £220		
Single 200K Drive Unit	at £159		
DFS fitted	at £95		
DFS unfitted	at £85		
Optional Power Supply for Dual System	at £35		
Please debit my Access/Barclaycard/Amex/Diners		Sub Total	£10.00
Card No.		VAT at 15%	
enclose a cheque for £ma	de payable to MW Systems		£
Vame	Company _		
Address			

Tel No

\*DRIVE 0 all the time.

Another way to get at programs that are on a disc on the non-default drive is to use \*LIB. You'll have noticed something like LIBRARY:0.\$ when you've catalogued a disc and probably wondered what it does.

The library tells the micro what drive and what directory to have a look at if it can't find what it's looking for on the current default drive and catalogue.

Don't worry too much if that doesn't make sense. It will when you try it in practice.

Normally the library is set to drive 0 and the \$ directory. If you've got a Basic program on the disc such as BODGER, under the default directory you'll find that you can now load it with \*BODGER.

This is the influence of the library, which is set to the default values. Purists say that you should use \*L.BODGER or your micro might crash, but I've never had any problems.

This can be changed using the \*LIB command. Before you do this, however, SAVE a few programs on the disc under another directory, for example, A.KATIE or A.PAUL.

Next change the library to the A directory on drive zero. \*LIB:0.A will do this. Now the DFS has another default to look at when you want a program.

The good thing about this is that you can load programs that aren't on the current default directory without messing about changing directories.

Try it. If you want A.KATIE you can load it with \*KATIE if it's a Basic program. If it's a machine code program it will actually run it for you as well.

This comes into its own when you've got two drives. You can use the first drive as normal but also you can access the second drive without having to use \*DRIVE or LOAD using the full file specifications.

All you have to do is to change the



library option to specify drive 1 and whatever directory you want to get at on that drive. Then just \*FRED or whatever will load it from the non-default drive. It saves a lot of time and trouble.

And that's it for this tour of the DFS commands.

You'll notice that I've ignored the "option" part of the catalogue. I'll cover this in a later article when I plan to deal with all the commands you find when you enter \*HELP UTILS.

As for now, I'll leave you to format a couple of discs and have fun playing around with the DFS.

It's not half as complicated to use as it is to read about.



.. and ERIC CRISP knows one of them

OUR friendly Editor walked up to me the other day and stated: "I want to dump my screen!". "Fine", I responded, "the tip's just down the road".

"No!" he said, "I want to dump it on

"Won't the printer get its ribbon

"Idiot!" he screamed, "I want to be able to play a game like Asteroid Miner and then dump the screen onto a

"Ah!" I sighed, "you want a program

Turn to Page 102

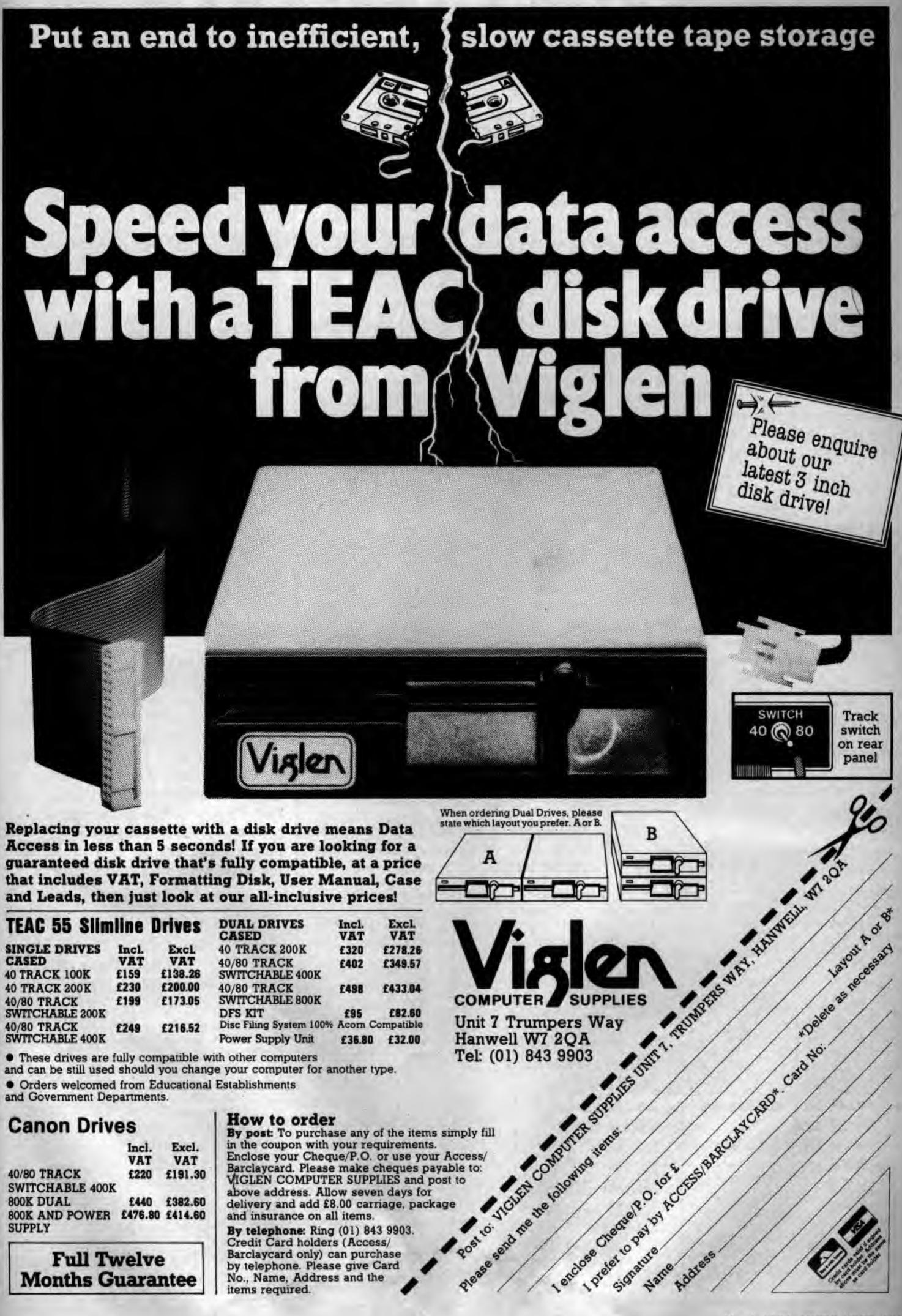


Latest Model-Super Slim Disk Drive

## FROM GIEN

Complete disk system for the BBC Model B







that responds to a particular key and saves the screen display even though another program was running at the time, so that the display can be dumped to a printer later – probably with that superb screen dump we featured in the January issue".

"Yes", wept our weary Editor.

A few hours later his dream had come true in the form of the two programs listed on this page.

Program I is in assembler and contains three separate routines.

The set interrupt program (lines 40 to 140) changes the IRQ vector to include the key test routine in the interrupt.

The key test routine (lines 180 to 300) tests to see if the \_ key has been pressed.

If it has not been pressed it returns to the normal interrupt handling procedure.

If it was pressed, the return from interrupt address on the stack is altered before returning to the normal interrupt handling procedures.

At the end of the interrupt control is transferred to the loader routine instead of the program being run when the interrupt occurred.

The loader routine (lines 320 to 540)

sets up a zero text window, clears the buffers, sets up KEYO, puts function key 0 into the keyboard buffer and executes a \*BASIC command.

Data for KEY0 and \*BASIC is on lines 570 and 590 and the CALL on the last line calls up the set interrupt routine.

Program II, which is "chained" in by the loader program, is in Basic and simply \*SAVE s the whole of a Mode 2 screen onto disc. At this point it is advisable to press the Break key to reset the pointers and variables in memory.

The screen display can be loaded back into memory by \*LOAD "SCREEN". If this is done from within a screen dump program, it is possible to then dump this to a printer.

This package was written for a disc system and will not work on a tape-only system.

Care was taken in fitting the program into areas of memory that are not generally used by games programs – part of the cassette filing system used for the BPUT and BGET from &380 to &3AF, and the printer buffer from &880 to &8BD.

If the program being used accesses these areas as well a system crash is almost certain. 10 \*SAVE"SCREEN"3000 8000
20 VDU 6
30 MODE 7
40 PRINT "SCREEN SAVED"
50 PRINT "DO NOT SAVE ANOTHER SCREEN
ON THIS DISC UNLESS YOU RENAME
THIS SCREEN DUMP OR IT WILL
BE OVERWRITTEN"
60 PRINT "THE SCREEN DUMP IS CALLED
'SCREEN'. TO RELOAD THE
SCREEN TYPE :- \*LOAD
SCREEN"

#### Program II

The area of memory used from &900 for the set interrupt rountine is only used for initialisation and can be safely overwritten.

The key chosen to initiate the screen save is not normally used in games and it will be all right in most cases. If a different key is required then the CMP instruction on line 190 of the key test routine can be changed.

The number &A8 (168 in decimal) for key "\_" is 127+41, where 41 is the negative inkey value shown as -41 on page 275 of the User Guide.

To use this utility, simply save both programs on a disc. Make sure the Basic program is called "SCDUMP". Load the assembler program and run it.

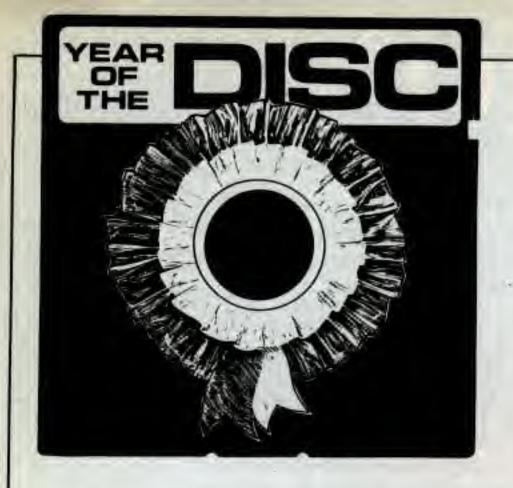
The computer is then ready to receive the game program or whatever it is. This can be on either tape or disc.

When the game is running, press the chosen key and the screen should be saved as it stands as "SCREEN" on the disc. \*RENAME it as necessary.

The utility may not work if the other program changes the interrupt or uses the same areas of memory.

10 FOR I=0TO 3	170 COPTI	340 .R JSR &FFEE	510 COPTI
STEP 3	180 .TEST LDA &EC	350 LDA#0	520 .B JSR &FFF4
20 P%=4900	190 CMP #&A8	360 DEX	:LDX#BAS% MOD 256
30 LOPTI	200 BNE RET	370 BNE R	530 LDY#BAS% DIV 256
40 .SETINT SEI	210 TXA	380 LDA#15	540 JSR &FFF7
50 LDA &204	220 PHA	390 JSR &FFF4	550 1
60 STA SD-2	230 TSX	400 LDA#18	560 KNEMZ=&380
70 LDA &205	240 LDA #SD MOD 256	410 JSR &FFF4	570 \$KMEM2="KEYO! MPA.=
80 STA SD-1	250 STA &103,X	420 LDX#KMEMZMOD 256	1900: *D. (MCH. "+
90 LDA #TEST MOD 256	260 LDA #SD DIV 256	430 LDY#KNEM% DIV 256	CHR\$ (34)+"SCDUMP"+
100 STA &204	270 STA &104,X	440 JSR &FFF7	CHR\$ (34)+"!M"
110 LDA #TEST DIV 256	280 PLA	450 LDA#138	580 BAS%=&3A3
120 STA &205	290 TAX	460 LDX#0	590 \$BAS%="B."
130 CL1	300 .RET JMP &0000	470 LDY#128	600 NEXT
140 RTS	310 .SD	480 JMP B	610 CALL &900
150 1	320 LDA#28	490 ]	
160 PX=4880	330 LDX#5	500 PX=&3A6	30





#### THE words disc and disc drive are often used when talking about computers, but I wonder how many people really know what makes a disc drive work?

By understanding the physical nature of discs and disc drives you will be more able to cope with the situation when things start to go wrong.

A disc storage system is a fast and convenient way to store programs and data.

The large mainframe computers (and some expensive small computers) use hard discs.

These are made of rigid aluminium and require a very precise drive mechanism as well as very clean air to operate in.

Most micros use flexible or floppy discs. These have a much smaller capacity for storing data and are much slower.

Generally they are more than adequate for the single user, as they are cheaper and require less finicky conditions than the hard discs.

The first point to strike a newcomer when looking at discs is the unmistakable fact that they are SQUARE! A moment's inspection will reveal that, inside the square envelope, there is a round disc made of a thin plastic (milar).

Coated on the plastic is a dark brown (sometimes black) layer of magnetic material. This is usually some form of metal oxide, ferric being the most common.

The coating is just like the one you get on tapes, so you can see a disc is a cross between a long playing record and a tape.

Do you remember the old riddle: "How many grooves are there on a long playing record?"

The answer, of course, is two - one on the front and one on the back.

For a floppy disc however, there are no physical grooves. Data is stored as a series of tracks (see Figure I).

The tracks are concentric rings of data. All tracks hold the same amount of data despite those on the outside being longer than those on the inside.

Some computers do have different amounts of data on different tracks but

## Dig that mixed up square disc -find out what makes it tick

most are like the BBC Micro and have the same.

This simplifies the disc filing system and, as outer tracks tend to be more frequently used, it also slightly increases reliability.

Normally only one side of a floppy disc is used, but you can get drives that will use both sides.

The disc drive is the "record player", a device to read and write data. The components of one are shown in Figure II.

Basically it consists of a drive motor to rotate the disc inside its envelope. It does this by gripping the centre of the disc.

Some discs have a thin plastic re-inforcing hub at the centre to improve the grip and give a longer disc life.

Once the disc is spinning the read/write head is moved across the surface to position itself over the correct track.

of a stepping motor. This is a motor that moves through a small angle, usually 7.5 degrees, every time it receives a pulse.

The rotational movement of the motor is converted into lateral head movement by a helical worm gear.

Thus the head can be moved with precision over the surface of the disc.

However, when the drive is switched on the head can be in any position, so there must be some way of finding

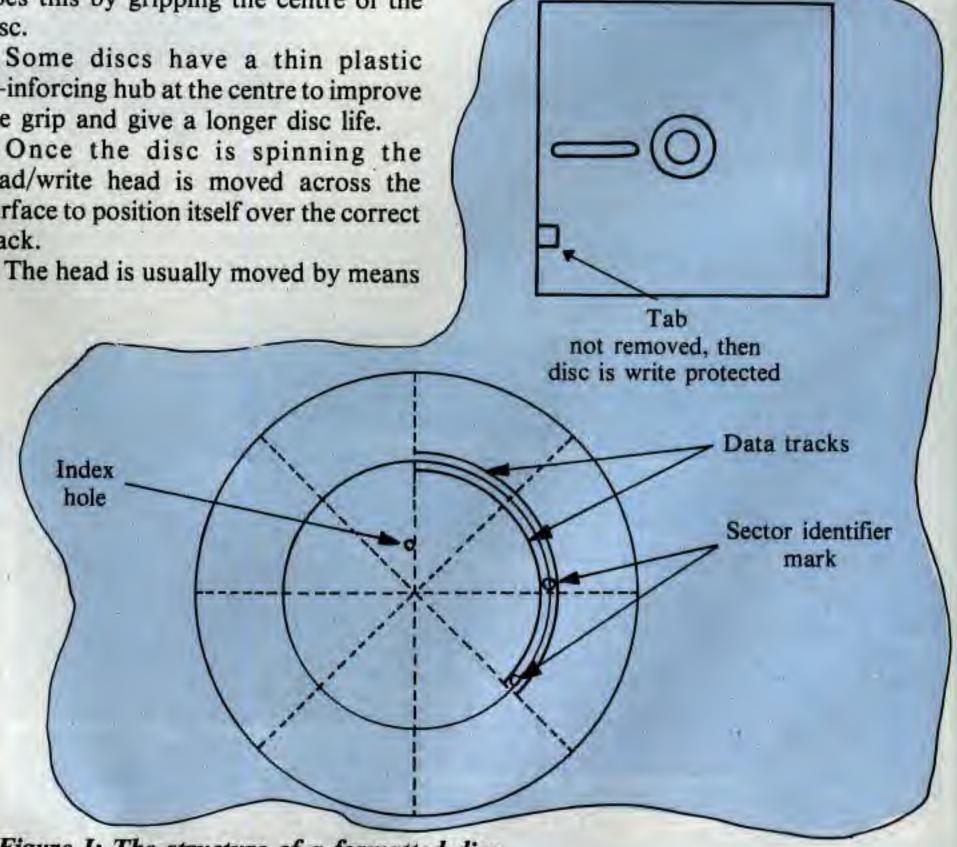


Figure I: The structure of a formatted disc

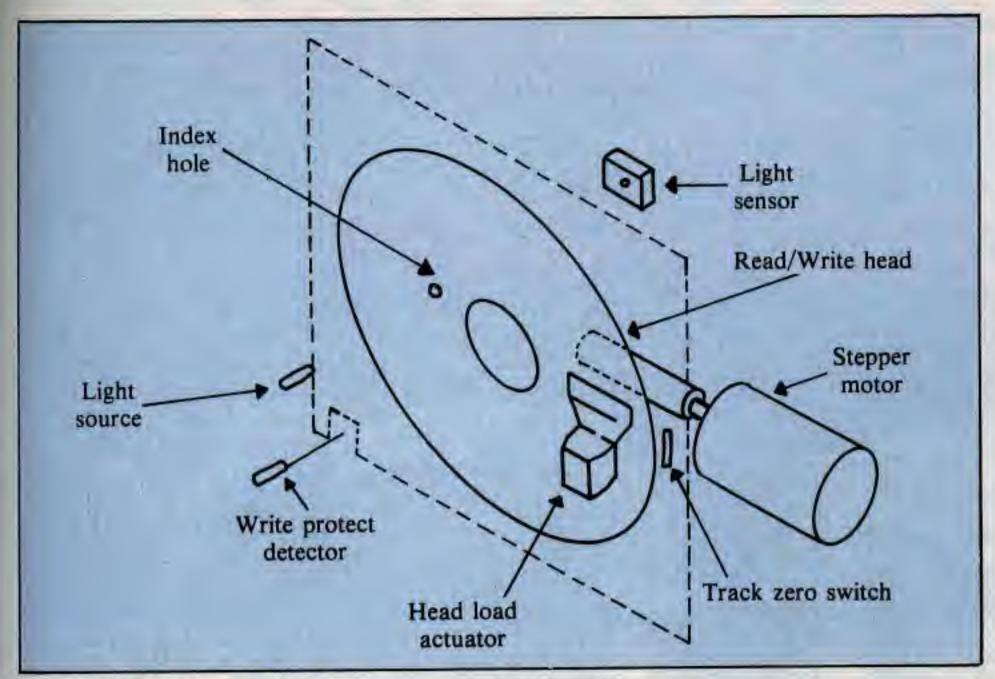


Figure II: Major mechanical components of a disc drive. The drive motor has been omitted for clarity.

precisely where it is.

This is usually done by a small micro switch which is tripped by the head when it is over track zero. The computer will keep issuing pulses to step the head backwards until this switch is tripped. This is known as restoring the head.

In order for the computer to find a precise position on any track, it must be given a signal at a fixed point on every disc rotation. This is provided by the small index hole near the rim of the disc.

Once every revolution this hole allows light through from an LED to a photoelectric sensor. This sends a pulse to the computer to indicate the start of the track.

Another photo sensor detects a notch on the outside of the disc's envelope. This is the write protect notch, and it can be covered up if you do not want to write onto the disc.

This will prevent accidents, as the software always looks at the signal from these sensors before performing any write operation.

There is also a head load actuator, a small lever controlled by an electromagnet. On the end of the lever is a small felt pad which pushes the disc against the read/write head.

This reduces disc wear by ensuring the disc is in contact with the head only when it needs to be.

On some disc units this actuator is very noisy and it may be heard clunking away while the disc is being accessed. This is not however a sign of a bad drive, merely a characteristic of the design.

In addition to the mechanical parts, a disc drive contains the electronics required to turn the motors on and off as well as reading and writing to the disc.

These electronics communicate with

#### By MIKE COOK

the computer over the disc bus. A bus is just a series of signal wires used to connect several devices together.

Most disc drives stick to a standard bus layout on the edge connector at the back of the drive. This means that manufacturers can have their own design of disc drive electronics and still be compatible with other people's products.

The standard disc bus is shown in

#### STANDARD DISC DRIVE BUS

#### Pin Use

- 2 Not connected
- 4 Not connected
- 6 Not connected
- 8 Index pulse (start of a track)
- 10 Drive select 1
- 12 Drive select 2
- 14 Drive select 3 (not used on BBC)
- 16 Motor on (spin disc)
- 18 R/W Head direction select
- 20 Step (a pulse causes head movement)
- 22 Data to be written
- 24 Write gate (enables data to be written)
- 26 Track zero switch
- 28 Write protect notch is covered
- 30 Mixed data and clock read from the disc
- 32 Surface select (for double sided drives)
- 34 Not connected

Note all the odd numbers are on the other side of the edge connector and carry the signal ground (or earth).

Table I

Table I. As more than one disc drive can be connected to a bus each drive must be assigned a number. This is done by making a link on the electronics board.

Each drive on the bus must have a unique number to prevent more than one drive being active at any one time.

The signals on the bus marked SELECT will therefore activate only one drive. The other signals convey information we have already covered.

At the computer end of the disc bus there is the disc controller chip.

This is a very complex device. It accepts command numbers from the computer's microprocessor and generates the sequence of pulses on the disc bus to enable the disc drive to carry out the required action.

This is because the microprocessor is not fast enough to perform these actions by itself.

For example, the microprocessor can simply issue a command to move the read/write head to track 10. The disc controller chip then looks to see where the head is, and works out how many steps, and in what direction they will be needed to get to track 10.

It then issues that number of head step pulses.

Finally, when the head is in position it reads the track identification number to confirm it is at the correct track. Having completed the task it then reports back to the microprocessor that the move has been made successfully.

If the move was not a success this fact is reported and it is up to the disc filing system software to take appropriate action.

Usually the head is restored (moved to track zero) and another attempt is made. Several such attempts may be made before the disc filing system signals an error.

Just then I mentioned the track identification number. This is information that is put onto the disc during the formatting procedure which every disc has to go through before it can be used. This writes on the disc track and sector information.

We have already seen that a track is a ring of data stored on the disc, but this is too large a chunk of storage to be convenient. This is because disc storage would have to be allocated in tracks, thus wasting a lot of space.

To remedy this, each track is broken down into a number of sectors. A sector is the smallest unit of storage the disc

DELIVERED TO YOUR DOOR \*

NO EXTRAS



#### 14" STANDARD RESOLUTION COLOUR MONITORS

- MATCHING BBC COLOURS
- RELIABLE 12 MONTH WARRANTY
- 40-64 CHARACTERS DOT PITCH 0.63mm
- FULLY COMPATIBLE WITH MOST COMPUTERS
- LOW POWER CONSUMPTION BRITISH MANUFACTURE

INCLUDING VAT, DELIVERY\* & PACKING £239.50

#### UNIVERSAL COMMUNICATIONS COMPANY

ROYD NOOK, ROYDSTONE ROAD, BRADFORD, WEST YORKSHIRE 0274-390114



#### DELIVERED TO YOUR DOOR\* **E125.0**5

NO **EXTRAS** 



#### 5% DISC DRIVE SHUGART SA450 DSDD **BBC COMPATIBLE FLOPPY DISC SYSTEM**

#### COMPLETE WITH:

- PROFESSIONAL ALUMINIUM CASE
- RIBBON CABLE TO CONNECT TO BBC MICRO
- POWER CABLE TO CONNECT TO BBC MICRO
- 40 TRACK DOUBLE SIDED DOUBLE DENSITY 400K
- MANUAL AND FORMATTING DISC INCLUDING VAT, DELIVERY\* & PACKING £125.95

Also available:

#### **BBC COMPATIBLE LOW POWER**

**DUAL DISC SYSTEM** ALL FEATURES AS ABOVE INCLUDING VAT, DELIVERY\* & PACKING £225.95

#### 51/4 CONTROL DATA FLOPPY DISCS

FULL RANGE IN STOCK	
DS DD 96 TPI Pack of 10	 £23.00
DS DD 48 TPI Pack of 10	
SS DD 96 TPI Pack of 10	
SD DS 96 TPI Pack of 10	
SS DD 48 TPI Pack of 10	

FILL IN THE ORDER FORM AND SEND IT WITH REMITTANCE TO:-

Universal Communications Company FREEPOST Roydr

QTY	PRICE	TOTAL
d)	239.50	
1.0	125.95	
	225.95	
	17.75	
	20.50	
	22.00	
	20.50	
	23.00	
֡֡֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜	OTY	239.50 125.95 225.95 17.75 20.50 22.00 20.50

7	ook, Roydstone Road, Bradford, W. Yorkshire BD3 7BR.
	NAME
	TITLE
	COMPANY
	ADDRESS
	**************************************
	POST CODE:
	I enclose a cheque/P.O. for a total of £
	PLEASE ALLOW AT LEAST 10 DAYS FOR DELIVERY

\* DELIVERY TO ANY ADDRESS IN U.K.

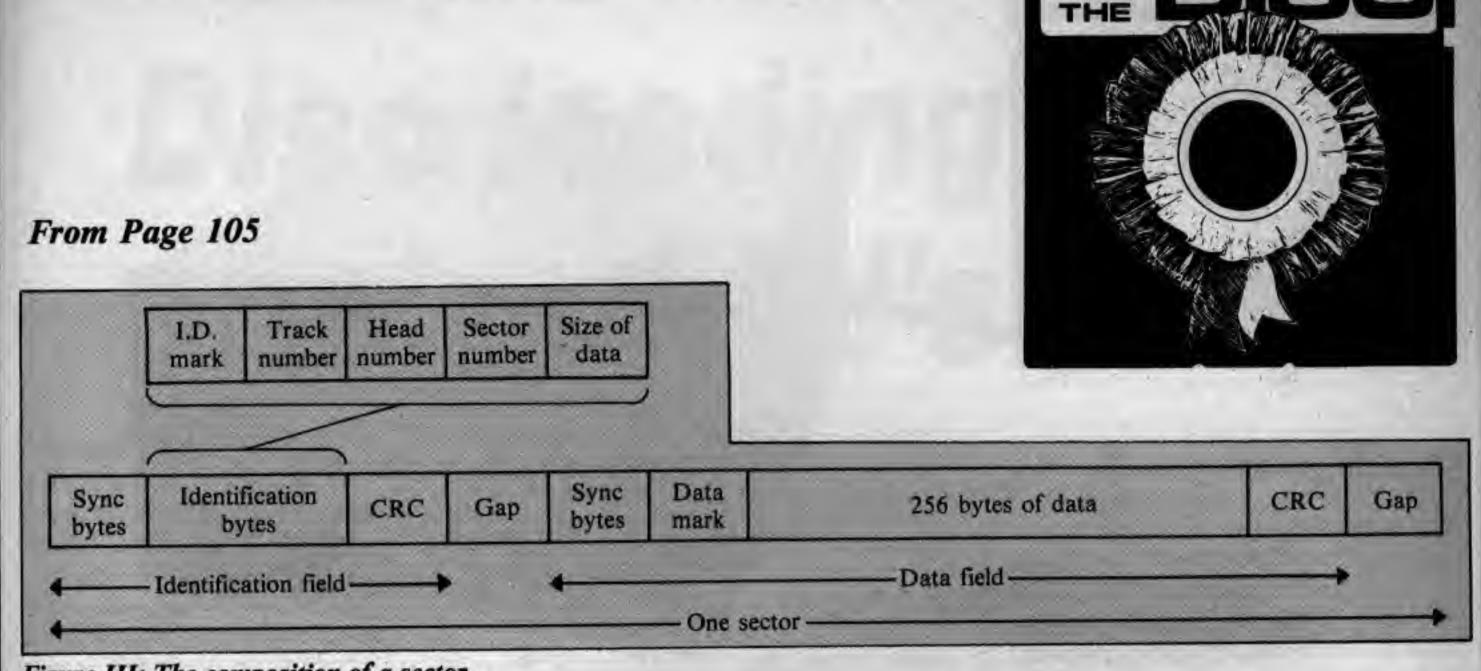


Figure III: The composition of a sector

holds, and all data transfer to and from the disc is done with sectors of data.

In the BBC Micro each track contains 10 sectors and each sector can hold 256 bytes (characters) of data.

Each sector has a few bytes of sector identification information before the actual data. This is shown in Figure III.

The CRC information is a Cyclic Redundancy Check, a simple method of testing the data for errors.

When data is written onto a track the disc controller chip calculates a 16 bit number from this data. This occupies the two CRC bytes and is written after the data.

When reading back the data the CRC is also calculated and compared with the CRC originally written with the data. If these are the same it is assumed there is no error.

However, if they are different then there has definitely been an error. The method used by the disc controller chip to calculate the CRC value is shown on page 399 of the User Guide.

In order for the start of a sector to be uniquely identified, a special code is written on the track — it is known as a mark. You will see in Figure III that

there is an identification mark and a data mark.

In order for us to understand exactly what a mark is, we must first see how normal data is stored on the disc.

It is stored in serial form just like the cassette tape system. But instead of the logic zeros and ones being represented by audio tones they are represented by a system of pulses.

Each pulse is represented by a magnetic field placed on the disc by the read/write head. Figure IV shows the form that one byte takes. Note that, unlike the tape system, there are no start and stop bits.

This is known as synchronous data, as opposed to the tape's asynchronous system and it allows more data to be packed into a limited space.

However, before we can make any sense of data in this form the disc controller chip needs to synchronise to it.

This is easily achieved by using clock pulses in every byte of data. The pulses are also needed due to the nature of magnetism – if they were not included the data could not always be correctly recovered.

Each bit starts with a clock pulse and if the bit is a logic one there is a data pulse in the middle of the bit time. There is a limit as to how fast these pulses can be put onto the disc so the capacity of the disc is fixed.

YEAR

The electronics surrounding the disc controller chip separate the clock pulses and the data pulses from the mixed stream which is read back off the disc.

A mark byte is a byte where some clock pulses are missing.

If you consider the clock component in a normal byte to be &FF (that is all ones, a clock pulse every time) then a mark will have a different number associated with the clock component.

There are a number of standard mark signals and these are shown in Table II. Remember that for normal data the clock component is always &FF. It just differs for the marks.

The disc controller automatically copes with the marks when finding a specific sector.

There are two types of data marks. The first indicates there is data in the sector and the second indicates the data

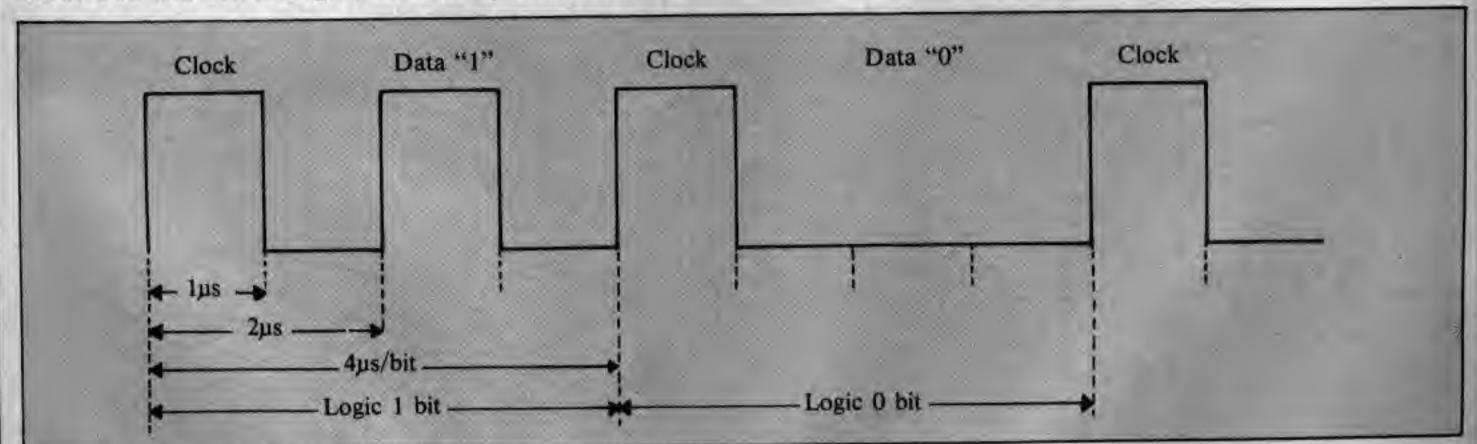


Figure IV: Data encoding



in the sector has been deleted.

This means to delete data you just have to change the data mark and not the data. The disc controller chip has special commands for reading data and deleted data. So sometimes, if you have the right software tools, it is possible to recover a deleted file.

The index mark is used at the start of each track and is placed just after the index hole has passed the detector.

Before each block of information there are the "sync bytes" that synchronise the decoder inside the disc controller chip. These six bytes are always data bytes with a hex value of 00.

This method of coding the bits in terms of pulses is not particularly efficient. Its main advantage, however, is that it is easy to separate data pulses and clock pulses, and also marks are easy to generate.

There is another way of encoding bits

ST	ANDA	RDMARKS
Clock pattern	Data pattern	Type of mark
(Hex)	(Hex)	
D7	FC	Index mark indi- cates sector start
C7	FE	Sector ID mark
C7	FB	Data mark
C7	F8	Deleted data mark

Table II



using fewer pulses and, as there are fewer, more bits can be put on any one track.

It is known as double density encoding and must not be confused with double track density, which is merely the result of the tracks being closer together.

The disc controller chip in the BBC Micro will not cope with double density encoding. However plug-in boards are available which allow the BBC Micro to cope with it. The method of double density encoding is shown in Figure IV.

It might seem a little difficult at first to see what is going on. Normally the clock pulse is missing and only the data pulse is present.

However, when the bit is a logic zero AND the previous bit was also a logic zero there is a clock pulse at the start of the bit time.

This keeps up the minimum number of pulses needed to keep the magnetic material happy.

You can see that in any one bit there are half the number of pulses, and so we have double the density.

Separation of the data from the clock pulses is complex and requires the use of

a circuit known as a phase locked loop. This circuit would require a whole article just to explain, so we are better off skipping that!

If you remember that discs store data in the form of magnetic pulses you can probably predict how to handle them.

Basically, don't touch the magnetic surface of the disc, as the grease from your finger will damage the head.

Don't put the disc near any magnetic fields as this will remove the magnetic pulses. Someone I know had a loudspeaker perched on top of his disc drive with the effect that most of the data was rubbed out when the drive made its first rotation.

Discs should not be subjected to extremes of temperature, and although they are floppy it does not mean they should be flopped.

Particles of smoke, not to mention cigarette ash, are also quite lethal to a disc.

Given reasonable care a disc should last at least five years of normal use, and some manufacturers guarantee their products for a lifetime. (The lifetime of what they do not say - the disc, perhaps?)

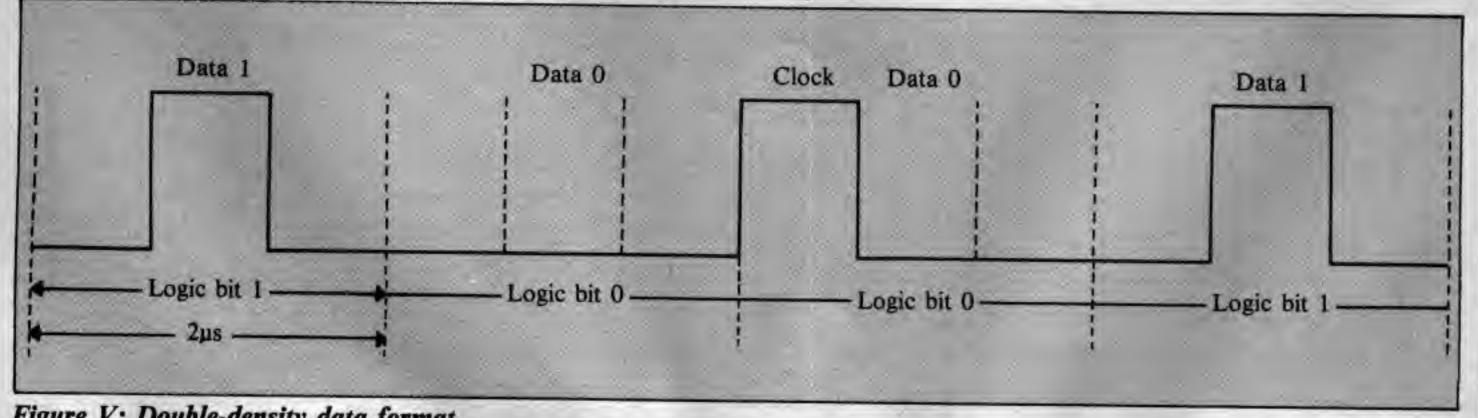


Figure V: Double-density data format

## Disc loading made child's play

THE BBC disc system is extremely easy to use. However some people, especially young children, find even this system tricky.

For those who wish to use a program, rather than change it, write it or do anything else, it is easier to use a disc system if a menu of programs on the disc appears and the user types a number to select a choice. It is with that in mind that I wrote this program.

The program can be used in two ways. People with an Acorn DFS should use PROCreadmem, which reads the copy of the catalogue from the memory. The same program can then be used on any disc.

As different disc systems store the catalogue in memory in different ways, PROCread allows the user to put the file names into DATA statements.

The DATA statements are then changed if the program is used for different discs.

If you are not sure which make of DFS you have, the make is indicated on the screen when you switch your computer on.

Here are the instructions to set up an automatic loading system:

- Type in the program as shown. You may type in just the part you require as indicated by the REM statements. Note that lines 1000 onwards should contain the names of the programs on your disc, rather than PROG1, etc.
- Save under the program with the name "MENU".
- Type \*BUILD !BOOT and press
   Return.
- After the number 1 that appears, type CHAIN"MENU" and press Return.

#### By PETE DAVIDSON

- Press Escape. The file !BOOT will then be saved to disc.
- Type \*OPT4,3 and press Return.
   (This is required so that booting the computer will automatically run the program !BOOT.)

Once you have set up the system, to use it you boot the computer by pressing Shift and Break together, then releasing Break but continuing to hold down Shift until the disc starts.

A menu will appear on the screen. Select the number of the program you require, press Return and the program will load and run.

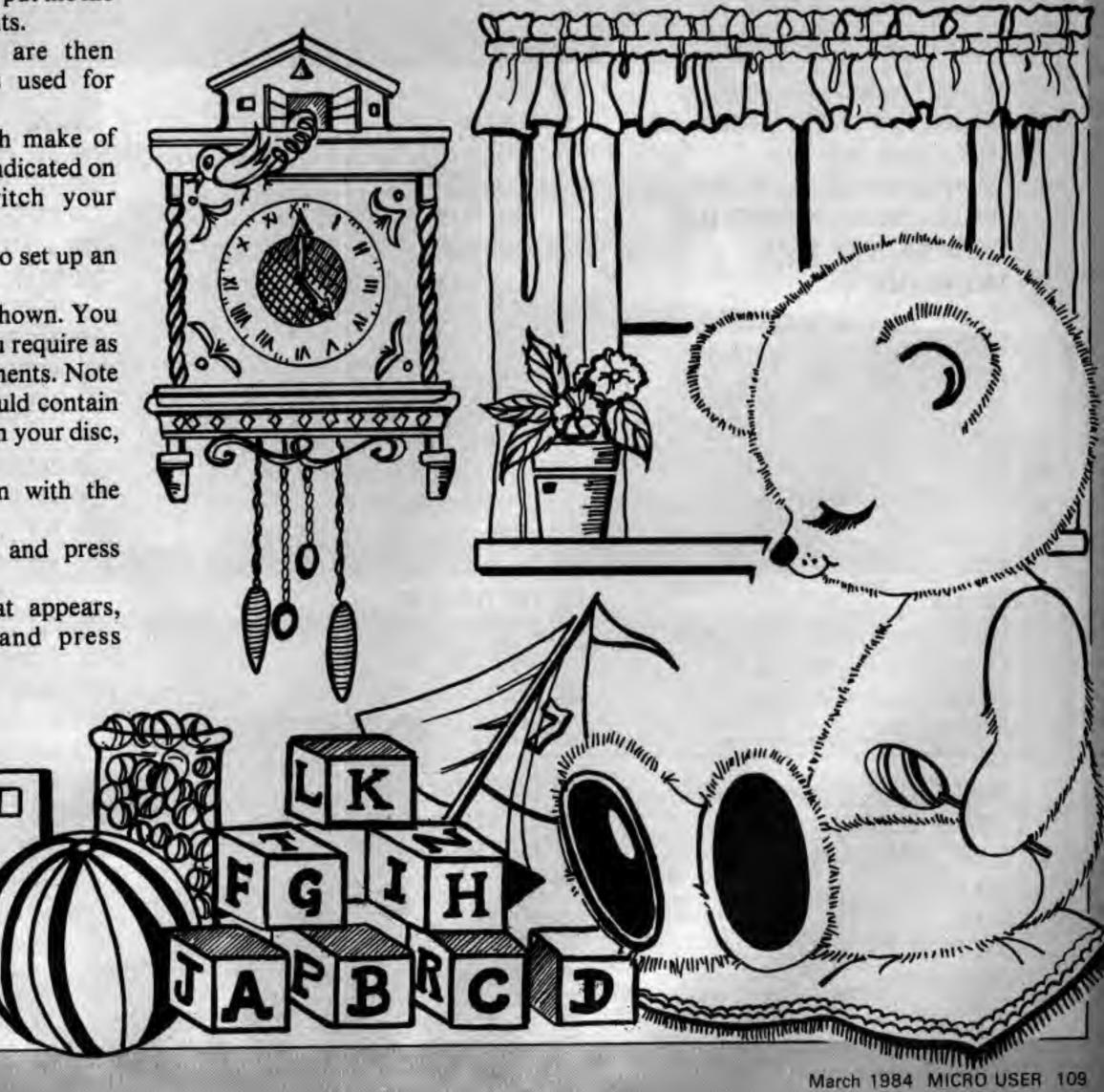
This program only works for Basic programs. The message "Bad program" will appear if anything else is selected.

How does it work?

With the Acorn DFS, memory locations &E00 to &E07 contain a copy of the first part of the title of a titled disc. From &E08 onwards is a copy of the names of the files on the disc in blocks of 8 (the 8th byte is not part of the name).

PROCreadmem reads these blocks of memory, while PROCread obtains the same data from DATA statements.

Note that if you have an Acorn DFS, you do not need lines 190 onwards and



lines 40 and 110 should read PROCreadmem.

With any other DFS, omit lines 190 to 240 and put the program names in DATA statements from line 1000. Lines 40 and 110 should be PROCread in this case.

The file names are stored in a string array and the appropriate element in the array loaded, moved lower down in memory to give longer programs room to run (downloaded), and run.

5	Sets up KEY0 to lo	ad,
	download and run	the
	program.	

10 Moves the display down one line (optional).

Selects MODE. 20

30 Initialise variables. J% is a program number. L% is start location for each program (with Acorn DFS). W\$(J%) are the program names.

40 Calls whichever procedure you have chosen.

50-60 Title lines. If you have an Acorn DFS (and are using PROCreadmem), put a title on the disc using \*TITLE

(see DFS manual). If you have any other DFS (and are using PROCread), put the title in place of the @ in line 280. The first seven characters of the title will be printed by this program.

70-120 Reads the next file name and stores it in the next element of the array. It uses either PROCreadmem or PROCread as described below. A check is made that there are not too many programs to fit in one column on the screen (line 100).

130 Sets N% to the number of programs.

140 Prints the program on the screen.

150-160 Takes in request and validates it.

170 Prints a message. 180

Calls KEY0 (see line 5). 190-240 PROCreadmem reads the next 7 bytes starting at L%

and stores them in a string WS(J%). These lines are only required if you have an Acorn DFS. In that case lines 40 and 110 should read

PROCreadmem.

250-270 PROCread reads the next item of data, converts it to a length of 7 and stores it in WS(J%). These lines (and the DATA statements) are only required if you have a DFS other than Acorn. In that case lines 40 and 110 should read PROCread.

280-5000 The DATA required by PROCread.

This program is written for clarity rather than efficiency.

It is hoped that, while working well for beginners, more experienced users will use the ideas to write more efficient programs themselves.

Colour control codes were entered using shifted function buttons. In the listing these show in PRINT statements as numbers in brackets, underlined. 129 corresponds to shifted f1, 130 to shifted f2 and so on.

The menu is set for 20 programs (which looks neater as a single column display). Change 140 to:

> 140FORIZ=1TONZ:PRINTIZ"... "W\$(IZ);:NEXT

and omit 100 to allow more names to appear.

#### Disc Loading listing

1 REM DISC LOADING PROGRAM 2 REM INCLUDING AUTOMATIC DOWNLOADER

3 REM (c) Micro User 1984

5 \*KEYO\*DISC:MLOADW\$(WZ):MIFERR(>OT HEN\*FX15,1:M\*TAPE:MDX=PAGE-&E00

: FORIX=PAGE TOTOP STEP4

:!(IX-DX)=!IX

: NEXT

:?(TOP-DX)=255

: PAGE=&E00: MOLD : MMODE7

: RUN I M

10 \*TV255

20 MODE 7

30 JZ=0

:L%=&E00

:DIM W\$ (40)

40 PROCread

:REM Change this to PROCreadmen if you wish the menu to be automatically read if you have an Acorn DFS.

50 CLS

:PRINT "(136)(130)PETE'S SUPER LOADING SYSTEM(137)";

60 IF (ASC (W\$(J%))AND 191)=0

THEN PRINT :PRINT

ELSE PRINT "... "W\$ (JZ)

:PRINT

70 REPEAT

80 LX=LX+8

90 JX=JX+1

100 IF JX>21

THEN PRINT "(129)TOO MANY FILES FOR THIS SYSTEM" " (130) CHANGE LINES 100 AND 140 AS DESCRIBED" "<130>IN THE ARTICLE"

:END

110 PROCread

:REM Change this to PROCreadmen if you wish the menu to be automatically read if you have an Acorn DFS.

120 UNTIL (ASC (W\$(J%))AND 191)=0

130 NX=JX-1

140 FOR IX=1TO NX

:PRINT "<129>"IZ"..."W\$(IZ) :NEXT

150 PRINT

:PRINT "<134>TYPE REQUIRED NUMBER ( THEN(136)RETURN(137))";

160 INPUT ""W%

: IF WZ<10R WZ>NZ

**THEN 160** 

170 CLS

:PRINT

:PRINT

PRINT " (133) LOADING "W\$(WZ) 180 \*FX138,0,128

185 END

190 DEF PROCreadmen

200 FOR 1%=0TO 6

210 L\$=CHR\$ (?(LZ+IZ))

220 W\$ (J%) = W\$ (J%) +L\$

230 NEXT

240 ENDPROC

250 DEF PROCread

260 READ W\$ (J%)

: W\$ (J%) = LEFT\$ (W\$ (J%) +"

\*,71

270 ENDPROC

280 DATA @

290 REM you may put a title (7 charac ters maximum) in place of @ in the above line if you require.

990 REM Put the names of your program s in the following DATA lines.

1000 DATA PROSI

1010 DATA PROG2

1020 DATA PROG3

1030 DATA PRO64

1040 DATA PROGS

5000 DATA €

:REM this line must be left as an end of file marker. Put your own program names in DATA statements from line 1000 to 4999.

- The complete AMS disc drive package, tailored to your BBC micro, is compatible with all disc interfaces and includes cables, a comprehensive manual and utilities on disc and EPROM. Housed in a steel case, matching the BBC micro, these reliable and robust Hitachi 3" disc drives are the ultimate for home, office and classroom.
- The 3" disc is totally enclosed in rigid plastic and a unique automatic steel shutter protects the delicate disc surface from dust and finger marks. For the first time discs can be used in industrial, educational and commercial environments without the worry of corrupting precious programs and data.
- The disc is "flippable" like a cassette tape and has a storage capacity of 100K on each side in single density mode (twice as much when used with a double density interface). A neat plastic switch can be flicked back and forth to write-protect valuable discs.

- The AMS disc drives are completely hardware and software compatible with 51/4" drives which can be used in parallel so allowing easy transfer of software. Consequently the 3" drives will operate with all the standard floppy disc interfaces. They take their power from the outlet provided by the BBC micro-there's no onboard power supply to corrupt data.
- The AMS package includes utilities on both a disc and an EPROM for formatting and verifying discs. The EPROM, which is easily fitted, offers a simple to use and permanent alternative to using the utilities disc.
- The impressively engineered Hitachi 3" drives feature an eject button allowing single handed operation, a multi-colour LED indicating the disc side in use, and a brushless direct-drive motor for reliable operation. The super fast track-to-track access time of 3ms is at the forefront of disc drive technology. The longest of programs are loaded in a flash.

## dvance wit

3" Disc Drives—The Ultimate Choice





#### Reliable delivery

If not available from your local dealer till in the coupon below and we will list rug disw uoy at it base no-quibble money-back quarantee. Advanced Memory Systems Ltd. Green Lane. Appleton, Warrington, WA4 SNG RING 0925 62907 24 HOURS 62682

TO: Advanced Memory Systems, Ltd, Woodside Technology Centre, Green Lane, Appleton, Warrington, Cheshire WA4 5NG.

Please send me by door-to-door courier:

Oty

Dty

AMS-3 (S) single disc drive all inclusive package at £225 each AMS-3 (T) twin disc drives all inclusive package at £399 each

with two free discs. Prices include EPROM, utility disc, cables, manual, VAT and delivery.

Please send me by post, if not with drives: double sided (100K x 2) discs at £4.95 each.

packs of five at £22.50 per pack.

I enclose a cheque for E or debit my credit card

No.

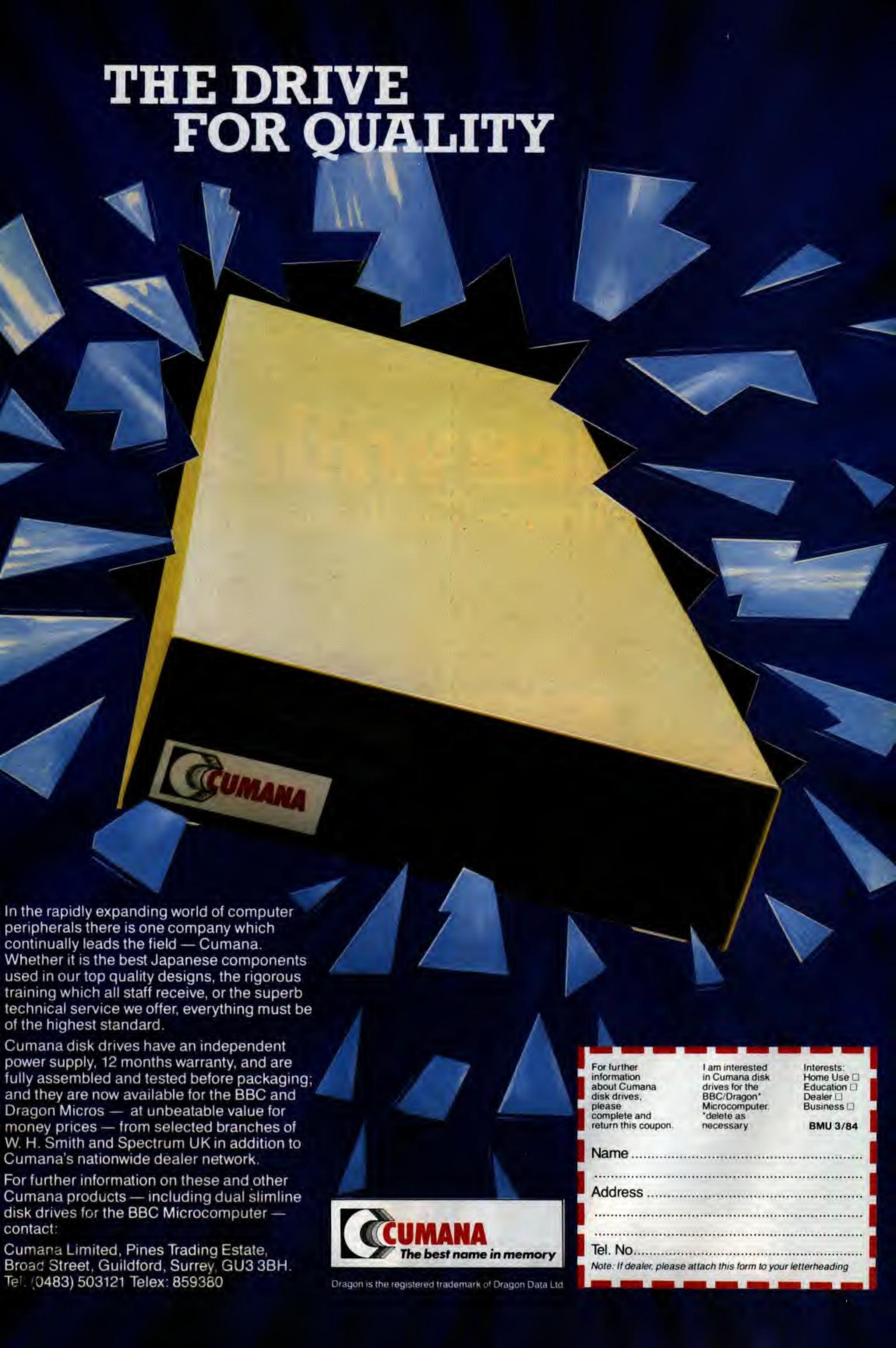
Name

Address

Post Code

Tel No

Date. Signature Please allow up to 28 days for delivery.



"THE difficulty experienced in loading a program from tape is inversely proportional to the number of copies of the program you have made".

Even with a sound understanding of the stated law, there are occasions when it is only possible to save your latest masterpiece once. It may be a long program and you are short of either time or tape!

Whatever the reason, the fact that you have only one copy puts you at risk of losing the whole program.

If just one block refuses to load correctly, pressing Escape is likely to prompt a rather curt, and singularly unsympathetic, "Bad Program" in reply.

A student who had been typing for two hours on a previous day suffered this precise fate. He was, quite correctly, convinced that the part that had been loaded was in there somewhere.

The problem was that the machine would not let him at it.

Fortunately, his lost block being near the end, it was possible to retrieve the situation so that he could LIST the complete lines which had been loaded.

He had then to retype only the last few lines which had been lost.

To follow how this can be done it is necessary to understand how a Basic program is stored in memory. The best way to do this is to examine the appropriate area of memory using the operator.

First, set up a function key to show the contents of locations PAGE, where your Basic program is stored, up to PAGE+20.

For example:

\*KEY9 FORI=PAGE TO PAGE+20 :PRINTI, ?I :NEXTIM

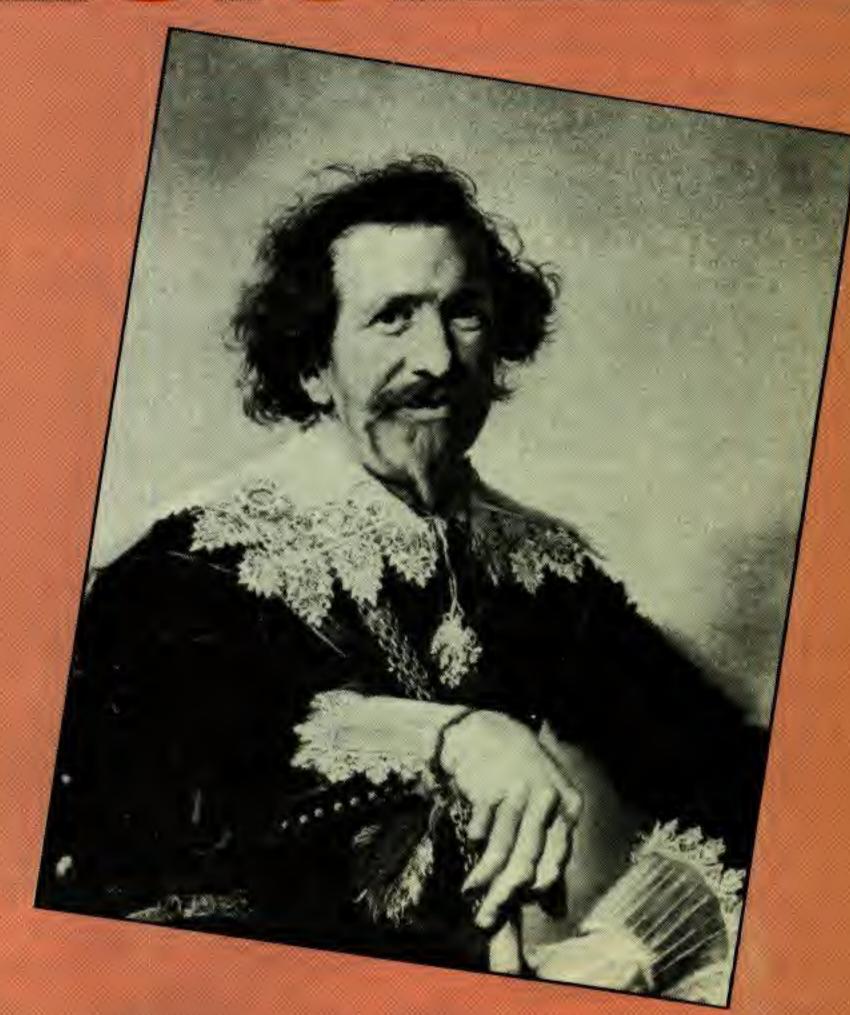
Then type NEW, press Return, and enter the simple program which we shall then examine:

> 10REM 20REMARK

Note that there are no spaces.

Pressing key f9 will now display Figure I.

On machines with the Acorn Disc Filing System installed the addresses will run from 6400 to 6420. These



FRANK DART shows how to rescue your latest masterpiece when the tape refuses to load correctly

œ			
	ADDRESS	CONTENTS	COMMENTS
1	3584	13	START OF BASIC LINE
1	3585	0	LINE NUMBER, HIGH
	3586	10	LINE NUMBER, LOW
4	3587	5	LENGTH OF LINE
1	3588	244	TOKEN FOR REM
J	3589	13	START OF BASIC LINE
J	3590	0	LINE NUMBER, HIGH
*	3591	20	LINE NUMBER, LOW
٩	3592	8	LENGTH OF LINE
1	3593	244	TOKEN FOR REM
·	3594	65	ASCII A
u	3595	82	ASCII R
à	3596	75	ASCII K
ă	3597	13	START OF BASIC LINE
	3598	255	LINE NUMBER, HIGH
1	3599	7	LINE NUMBER, LOW
	3600	0	does not matter
1	3601	0	does not matter
	3602	141	does not matter
	3603	72	does not matter
	3604	160	does not matter
1,1	The second secon		

Figure I: Basic program storage

# Increase your fire power!

# More than just a joystick—a system

▲ Nylon encased—Steel shafted joystick with ball and socket joint.

▲ Fast sprung return to centre.

Graphite wiper linear potentiometers.

▲ 12 Months Guarantee.

▲ 7 day Money back Guarantee (on Hardware).

# Complete control at your fingertips

A superb joystick and a keypad for the price of either one. Plus the software to integrate it into the computer's system. One handset will work on it's own in the A/D port as a joystick and two fire buttons. Joystick is immediately compatible with ACORNSOFT and similar software.

The adaptor box joins together the analogue and the user ports to use the full keypads giving a total of 24 user definable keys. The adaptor box can also be used as a splitter for the A/D port to take two items at the same time, e.g. joystick and lightpen.



SAE for more detailed information.

Numerous stockists nationwide or direct from us.

DELTA 146 HANDSET £12.95 DELTA 14b/1 ADAPTOR BOX £13.95 DELTA DRIVER CASSETTE £5.95 or DISC £8.95 Prices include VAT and P&P.

oitmacedella 14h

VOLTMACE LTD, PARK DRIVE, BALDOCK, HERTS. SG7 6EV.

Tel: (0462) 894410

# From Page 113

figures will vary with other DFS.

Basic is stored in a compressed fashion using "tokens" for the keywords – that is, one byte is used as a code for the keyword. The tokens are listed on page 483 of the User Guide.

Of greater interest at the moment are the four extra bytes on each line. In line 10 these are 13, 0, 10 and 5. In line 20 they are 13, 0, 20 and 8.

Each line of the Basic program can be distinguished by the 13s which can be thought of as start of line markers.

The two numbers which follow each 13 are a coded version of the Basic line number.

The first (LINE NUMBER, HIGH) is "how many 256s in the line number". The second (LINE NUMBER, LOW) is "how many leftover". So line 10 is recorded as:

0 256s

10 left over

Line 300 would be:

1 256s

44 left over

and line 1000 would be:

3 256s

232 left over.

The third number after each 13 is of particular importance. This gives the length of the stored version of each line.

A consequence of the way that this value is worked out is that the "line length" byte gives the address of the next 13 when added to the address of the previous 13.

In our example the first line, 10REM, is stored from location 3584 and upwards. Since the line length of this line is 5, the next line is stored from location 3584+5=3589 and upwards.

One advantage of this method is that the Basic interpreter can quickly scan through the program, looking for a particular line number without having to read all the text.

Let's refer to the line length bytes as "links", since they link one line to the next.

A correctly linked program is one in which you can keep adding the link to the address of the previous 13 to get the address at which the next line starts. This should contain 13.

If it does not, then something has gone wrong and it is a "Bad Program".

A lost block would, at some point, give a link to an address which had not been loaded with the required 13, hence "Bad Program".

To retrieve what has been loaded

correctly it is necessary to make the interpreter think it has reached the last line of the program before it reaches the bad link.

Fortunately this is relatively simple. Looking at the example once more you will see that the last line links correctly to a 13 (3589+8=3597) which should mark the start of the third line.

"But", I hear you say, "there is no third line".

Well, this is the way the end of the program is stored – the physical end that is, whether or not it be an END statement.

There is a 13 just as if it is another line, but the LINE NUMBER, HIGH is a rogue value. A 255 in this position would mean a line number of at least 255\*256=65280.

Since the highest you can use is 32767 this particular value signals the end of the program.

All we need to do to stop the "Bad Program" error is to put 255 into the first of the two line number bytes before the bad link is reached.

This will fool the interpreter into believing it has reached the end and it will therefore look no further. The bad link will not be seen.

The secret is to put the 255 in the correct position to maximise the number of lines retrieved.

The program below does just this:

10 PX=3584

20 REPEAT: PRINT256\* (PX?1) +PX?2

30 LX=PX?3:PX=PX+LX

40 UNTIL?P%(>13:PRINT"FAILS HERE"

50 P%=P%-L%:P%?1=255

60 PAGE=3584

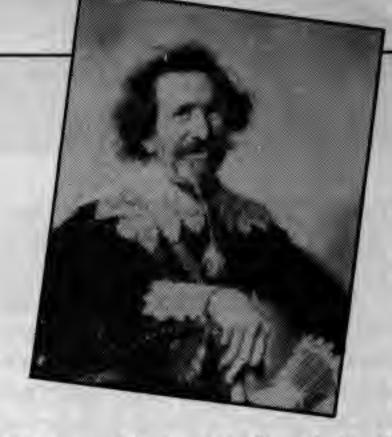
This may be typed in when needed, or can be loaded from tape. In either case it is vital that it is located in some free area of memory so that it does not overwrite the program that is being retrieved.

A convenient way of doing this would be to ensure you were in Mode 7. This gives the maximum room to play with. Since HIMEM is &7C00 and the retrieve program is less than one block long, it can be safely placed at &7B00.

The way it works is to use a pointer, P%, to point at each successive 13 starting at PAGE. The line number is calculated from the coded form and printed onto the screen.

The link, L%, is picked up from location P%+3 and is used to calculate the address at which the next line should start.

So long as this address contains a 13, the process continues.



When a 13 is not found in the calculated position—in other words, the link is broken—L% is taken off the pointer to go back to the previous 13.

P% is now pointing at a line which does not link. The 255 is then put in at P%+1 to terminate the stored version correctly.

Finally PAGE is set back to its original value so that typing LIST will display what has been recovered. This can now be edited or added to in the normal way.

Try it out using the following procedure:

1. Load a fairly long Basic program but press Escape before it has finished loading. You should get the "Bad Program" error message.

Having thus simulated the problem of the lost block:

2. Type:

MODE 7 Return
PAGE=&7B00 Return
NEW Return

The use of &7B00 for PAGE is convenient, being safe for both cassette and disc machines.

NEW will not lose your previous program as PAGE has been reset so that the retrieve program will be stored well out of the way.

3. Type in, or load, the retrieve

program.

4. If using an Acorn DFS change the number 3584 to 6400 in both lines 10 and 60. For other DFS change this number to the appropriate page number.

5. RUN the program. You should see the retrieved line numbers scrolling the screen.

6. Type LIST to display what has been recovered.

Should you need to use this utility in earnest then you should perform steps 2 to 6 only.

You may never need this program but, being so short, it is worth typing in and saving just in case you do.

Make a note of the instructions (2 to 6 above) and copy the listing on a piece of paper. Store this in the cassette box with the program on cassette. The copy of the listing is just in case the program won't load.

But isn't this where we came in?



**Paintbox** 

Oakleaf

"WHAT'S the point?" said a learned friend when I told him I was painting pictures on a micro. "You might as well stick to real brushes and canvas – you'll get a much better effect".

Well, yes I suppose so. But then again, you could have told Michelangelo to stop messing about with a chisel and a block of marble – or scoffed at the early photographers experimenting with their new-fangled cameras.

The point is that you can use just about any kind of medium to produce something artistic, so why not a computer?

There are quite a few methods to do this – a light pen is perhaps the one that most accurately captures the feel of drawing.

Paintbox, however, uses keyboard, graphics tablet and joysticks to create images — with very interesting results once you get used to painting by proxy.

You get a choice of Modes 0, 1 or 2 but I found the first two difficult to work with as the palette or bar of colours at the top of the screen was so tiny. And anyway you are limited to just a few colours.

So I began in Mode 2, and after several minutes cursing the cassette player, the micro and the program itself I discovered that in order to get an image it helps if you don't try painting in black on a black screen!

Perhaps the programmer could have worked it so that the cursor's colour defaults to white at the beginning.

There are lots of facilities. It's easy to create geometrical shapes and lines by pressing just one or two keys and moving the cursor around.

But even better, from an artist's point



# The micro-age answer to Michelangelo?

of view, is the command that enables you to build up tones — combining several colours by using a dot pattern instead of solid or flat areas of colour.

I found that using joystick and keyboard together was the best way to control the cursor – joystick for general areas of colour, with a freer style and keyboard for finer detail.

Pressing keys 1 and 2 alters the speed in the keyboard mode, useful if you want to do carefully controlled intricate detail. But why, oh why, did this command have to be put next to the Escape key, which wipes out the image on the screen?

I'd spent more than an hour on my masterpiece and was putting on the finishing touches when I accidently hit Escape and the whole thing disappeared.

Surely it wouldn't have been too difficult to arrange things so that you have to press Escape twice before the screen clears?

The instruction manual is fairly comprehensive and easy to understand.

The manual claims that the program lends itself to serious applications such as computer aided design but from my experience I think this might be asking too much.

I don't have a graphics tablet, so perhaps it is unfair of me to judge it on that score — certainly keyboard and joysticks are not able to reproduce images as accurately as CAD demands.

But Paintbox would really come into its own in the classroom. It has always been one of my complaints that arts and sciences are kept too much apart, and inevitably that leads to specialisation in one field with little knowledge about the other.

Using a computer in the art class might convince the person who is bored to tears by aggressive arcade games (as I am) that there is a lot more potential for creativity on a computer than is at first apparent.

Also, the type who curls up in horror at the thought of sitting in front of a drawing board might just be tempted by the prospect of using a micro.

If you want to paint traditional style works of art then stick to brush and canvas, as this package can be no substitute.

But there is a lot of scope for experimenting with images using a computer, and Paintbox provides a flexible way of doing just that.

Every school should have this program. Heather Sheldrick

# PLAY A BIT BELOW PAR-BUT NOT THE PROGRAM

Supergolf

Squirrel

I'VE never played golf and, having had a go at Squirrel Software's game Supergolf, it's unlikely that I ever will.

Not that it's a bad game, in fact it's very good. For your money you get an 18 hole course, a score card and a set of golf clubs.

Also, if you're as bad at it as me, you get humiliated into the bargain.

You see, no matter which club I choose from the set of nine irons, I can't get it right.

I've tried all the different strengths of swing (from one to 99) and I still can't judge it.

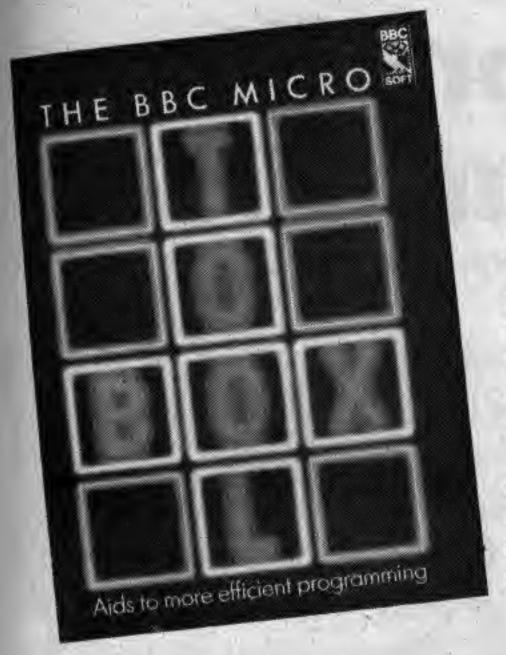
My ball has a terrible affinity for the bunkers or, even worse, water. And my putting is agonising to watch.

Nor does it improve matters when I get a scorecard at the end of each hole telling me how far below par I am.

It's an interesting game for up to four players, well conceived and well worth playing.

Yet, terrible though I was at it, Supergolf remained fun and left me wanting to play again. Enough said?

Nigel Peters



# Well set-up workshop toolkit BBC Soft **BBC Micro Toolbox**

THIS set of 25 utilities comes from Ian Trackman, the "Making the Most of Your Micro's" programmer extraordinaire. As you would expect, it contains some very useful programs.

They are in two sets. One contains routines that can be included in your own programs, while the other is intended purely as program development aids.

# Get to know the lie of the land Bryants

County (SM)

TWO related programs provide a useful aid to familiarisation with local geography. For this review just County (SM) will be described. Its companion program, County (SW) deals with the south west peninsula of England.

County (SM) covers the counties of Dorset, Hampshire, West Sussex, Surrey, London, Berkshire, Wiltshire and Avon. There are two options on the menu - identifying towns, and identifying rivers or counties.

The first option displays an attractive four-colour map with the locations of 20 different towns marked on the map by a cross.

The user is prompted to find, for example, Lyme Regis. This is done by flying a small aeroplane over the map, using the cursor keys, until it is over the cross which you think marks the town you are looking for.

If the location you choose is not the correct one, then the computer responds with "That's Dorchester" or whichever town it is.

When you do get the location right, it plays a little tune and responds with "Good - you found it". After two questions you're told how long you took to correctly locate the two towns.

This part of the program is good. The aeroplane doesn't move all that fast and tends to leave a smudge when you stop over a town, but the graphics are colourful and the controls easy to use.

The second part of the program,

identifying rivers and counties, covers the rivers Frome, Stour, Avon, Wylye, Yeo, Cherwell, Thames, Wye, Test, Itchen, Rother, Arun and Wey.

The map display has the counties shown as before, but this time they are each numbered, as are the rivers. To help you a little adjoining counties are named to provide a few ideas of scale and reference.

The user is prompted to name, for example, river R12 or county C5. If the input is wrong then the computer beeps and gives the right answer, but if it is correct then it responds with "Correct well done!".

Every now and then you are told how long it took you to answer the last question, which helps keep you on your toes a bit, and after 10 questions you go back to the menu.

There really ought to be a scoreboard to tell you how many answers you got right, and whether you were better at the rivers or at the counties. But there isn't, so you would have to note this for yourself if you wanted to know which to practice on to improve your answers.

Overall, though, this is quite a nice and useful program. It doesn't come with any documentation, which could be useful, and isn't quite as polished as it could be, but probably represents good value for money nevertheless.

Jane Jackson

The first set contains six sorting routines, circle generating codes, three character generating/printing programs, a graphics dump and a speech unit utility. Most of these are written in Basic and are well annotated with REMs.

I particularly liked the Shape Maker program which allows one to convert a shape on the screen into user defined characters.

The second set of programs seem to be what every writer of large Basic programs on the BBC Micro has been waiting for - if he/she hasn't already written them.

There are, for instance, three utilities that help to shorten Basic programs. The first is a REM stripper which not only removes REM statements but also lines with only colons or spaces.

Follow this with a space removing program and then a packer that tucks as many statements as possible on to one line and your original program is considerably shorter, and hopefully faster.

With a disc system the whole process is easily automated and is explained in the manual.

Conversely, if you have a packed program that you would like to make understandable you can use the unpacking and spacer programs that unravel most of the mess that the above programs have created.

Add to these a cross-referencer, a variable dump, a global replacer and a resequencing program, and a good deal of the drudgery of writing in Basic is obviated.

The programs come on tape but with full instructions on how to write them on to disc.

A colleague wrote a small program which automatically transferred the programs from tape to disc for me, and this would have been a nice addition to the package.

The manual is large (208 pages) and has complete listings together with concise explanations.

This is a very useful addition to any Basic programmer's toolkit.

Alan Plume

**Business Games** 

Acornsoft

THE Business Games cassette from Acornsoft contains two business games, Stokmark and Telemark.

Stokmark allows one to eight players to deal in the shares of four different companies on the Stock Exchange. The aim is to make as much money as possible.

As in real life, a player's wealth is increased through the receipt of dividends — a share of a company's profits — or through making a capital gain if the share price rises.

Of course the share price could fall, so that a player could make a loss.

The guide accompanying the tape explains some of the terms used in investment analysis.

Using these the program produces regular reports on each player's wealth and on each share's performance so that they can plan their next moves.

The main influence on the value of the shares is whether they are being bought or sold. If there is heavy selling then this depresses the share price. If a share is sought after, however, then the price will be forced up.

As in real life, there are also random economic factors, such as strikes, which affect a share's performance and make planning difficult.

The game is a well-presented and

# Make a profit with your micro

useful introduction to some investment terms, but I thought that it became rather repetitive after only a short time.

Telemark is a game for four players or teams involving the manufacturing and marketing of TV sets.

Players start with the same amount of cash and are then asked to make capital investment decisions, such as the size of the factory, which will determine the production and storage capacity of the businesses.

The larger the factory the more can be made, stored and potentially sold but the factory overheads or expenses will also rise.

The players are then asked to make production, marketing and pricing decisions, all of which can influence the profits which will be made.

For example, if your prices are set too high then other suppliers may win part of your market share.

If your prices are pitched too low then, although you may gain a large share of the market, you may not be charging enough to make a profit.

Certain random effects are also built

How many do you wish to buy? 5

DAILY NEWS

NEW POWER STATION TO BE NUCLEAR

Yesterday's Price changes.

Colemine -9

Press SPACE BAR to continue

in to make decision making a little more difficult - and realistic.

At each stage the program checks to see if a player's decisions are feasible. There may not be enough production capacity, market share or cash to enable the plans to be fulfilled.

To help, each player is given frequent opportunities to have information vital to decision-making displayed on screen.

At the end of each round financial and market share reports are produced so that the players can see how they are getting on.

This is a good game and to be properly appreciated must be played seriously.

Rather than making decisions by blind guesswork, which will teach little and quickly becomes dull, players should carefully plan the development of their businesses.

They must ensure, for example, that they will have enough cash for future operations and that they will charge a price that will return them a profit. A pencil and paper are indispensable.

Acornsoft have obviously realised that this is an important aspect of the game and they have provided some blank charts in the program guide to help players work out their cash flows and to estimate suitable selling prices.

As a small point, I think that many people would appreciate a worked example in the program guide showing how the profits and, in particular, the balance sheets are calculated. This would help make a good game even better.

Ken Garrett

# QUICK RUNS

A first look at some of the latest releases

Trafalgar: A wargame between two fleets, English and French, as in the battle of Trafalgar, for two players or one against the micro. Combat is on the basis of ship to ship engagements with cannon broadsides trying to take out the opposing guns.

When firing you have to take into consideration wind speed and direction, deck height and distance. Victory goes to the first to sink his enemy's fleet. (Squirrel)

\* \* \*

Chuckie Egg: Moving around a multi-level hen house by climbing ladders, jumping, dropping through holes or taking convenient lifts, your task is to collect 12 eggs and as much corn as you can.

Opposing you initially are three roving birds. As the game progresses

you encounter a vicious, intelligent flying duck, which takes over and follows you relentlessly. (A & F)



Space Shuttle: Your mission, as pilot of the US Space Shuttle, is to launch it, retrieve a malfunctioning satellite and then make a safe landing. Weather conditions are preset for each "run" and you are debriefed at the end of your performance. (Microdeal)



Missile Control: By cunning use of your three missile batteries, you must defend a city from showers of enemy missile attacks.

With each successive wave the attack strengthens, incorporating planes, satellites and intelligent missiles. A game for up to four players. (Gemini)

# Free software, only £225.

If you own a BBC Micro, you can now download, store and run programs (transmitted free of charge via Ceefax) with the new Teletext Adaptor, priced £225 inc. VAT.

These programs make up the BBC Telesoftware Service (which is intended to become a computer software broadcasting channel) and although primarily educat-

ional, they will soon develop into general interest and

business areas.

And, as they will change every two weeks, you'll soon be able to build up a vast bank of top quality software without ever having to put your hand in your pocket.

But that's not all the adaptor has to offer. It also enables you to gain access to the normal teletext store of data. This is different to simply having a teletext TV because it means

this data can now be transferred to memory and manipulated in any way you wish (making graphs or bar charts for instance).

It's yet another development in our programme to help you fully realise your

BBC Micro's potential.

If you're a credit card holder you can order the Teletext Adaptor by ringing

> 01-200 0200 at any time or 0933-79300 during office hours.

(You can also find out the address of your local BBC Micro dealer by calling the same numbers.)

Alternatively, you can order it by sending off the coupon below.





# Technical Specifications

Access to Teletext and Telesoftware Services broadcast on U.H.F. channels E21 to E69.

Speed of max. data capture rate approx. 128k baud.

(8 lines of Teletext per frame.)

Height 70mm. Width 210mm. Depth 350mm. Weight 2kg.

Colour: BBC Computer cream.

Construction: Moulded top and bottom to match BBC computer profile. ABS injection moulded plastic.

Controls: Four tuning potentiometers on rear panel.

Mains on/off switch on rear panel.

Power in 240v, 50Hz, 15w.

Operating Temperature: 10° to 35°C.

Designed and manufactured to comply with BS415 Class 1 standard.

Signature	Registered No. 140 3810 VAT No. 215 400220
	Postcode
Address	
Name	
Card Number	e)
Readers A/C, Acorn Com	ry. I enclose PO/cheque payable to puters Ltd, or charge my credit card.
	BBC Teletext Adaptors at £225
To: BBC Microcomputers Denington Estate, Wellin	s, c/o Vector Marketing, gborough, Northants NN8 2RL.

# The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

Ajoint presentation by Do The Micro User & Electron Do

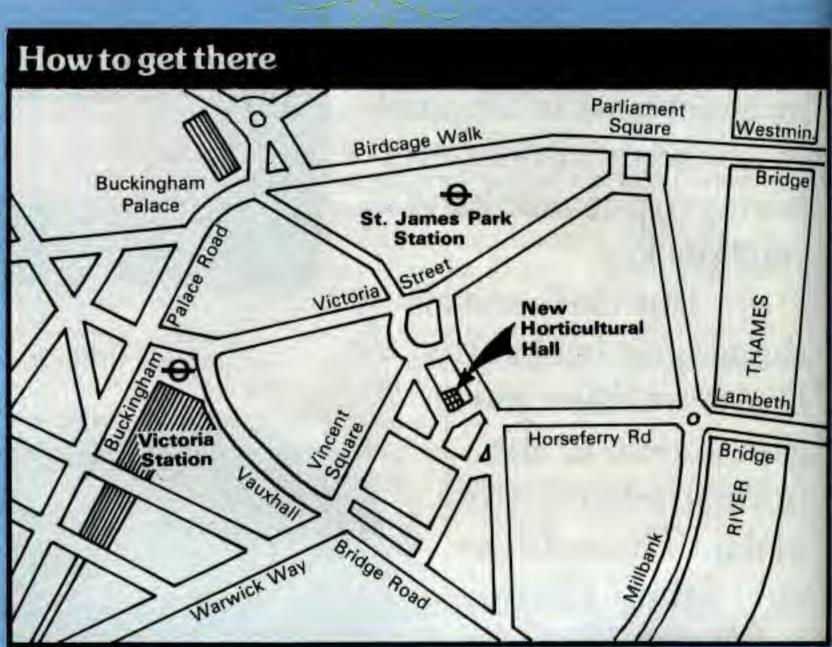
# Don't miss the great new for the Electron

Here's your big chance to catch up on all that's been happening recently in the fast-developing world of the Electron and BBC Micro. And there's so much new to excite and intrigue you ....

NEW programs from the fertile minds of Britain's leading software writers – games galore, plus a growing number of new packages for teachers and for industrial and business users.

NEW hardware add-ons that expand even more the power and versatility of your micro.

Electronics wizards regard both the Electron and the BBC Micro as a challenge to their ingenuity. Their latest creations on display at the Electron and BBC Micro User Show will astound and delight you!





# School and College Groups

Entry only £1 per student if bookings are made in advance. Send your cheque (made payable to Database Publications) and SAE to:

Electron & BBC Micro User Show 68 Chester Road, Hazel Grove Stockport SK7 5NY Tel: 061-456 8383 Spring show of all that's and BBC Micro

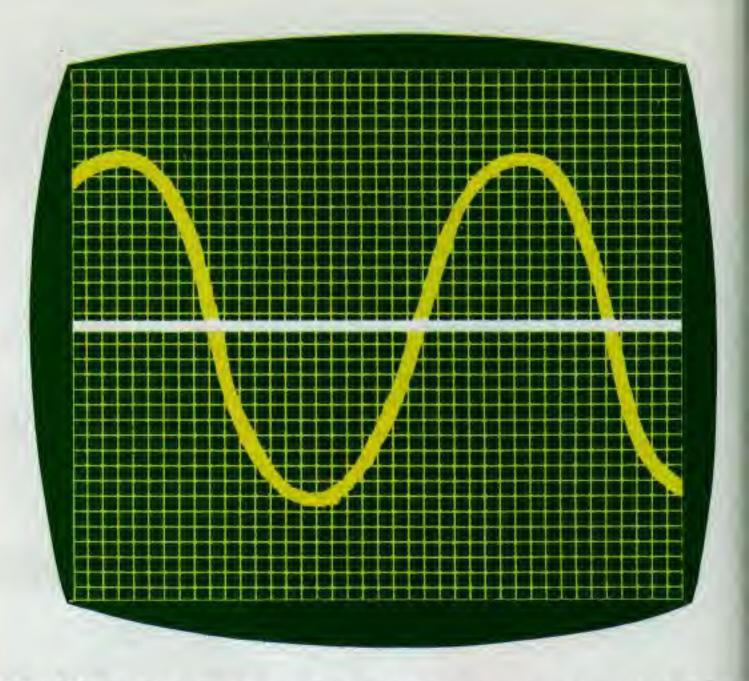


# New Horticultural Hall

(Westminster Exhibition Centre)

Thursday to Sunday, March 29 to April 1

# Here's an easy Way to turn Into a rea time oscilloscope



WHILE the BBC Micro has more additional inputs than most other computers, it cannot hope to have all the different types we might need for every situation.

This is very pleasing for me as it keeps me in employment! However, it can be quite frustrating when you find the machine will not do quite what you want.

This occurred recently when a teacher asked me if it was possible to use the BBC Micro like an oscilloscope.

"No trouble," I said, "just use the built-in analogue input port".

Well it turns out that this is fine for slow waveforms, but anything over 30 Hz and the converter is just not fast enough to cope.

As the teacher wanted to display audio waveforms to the class, something extra needed to be built.

There are many analogue to digital (A/D) conversion techniques, and they are mainly a three way compromise between speed, accuracy and cost. So on a fixed budget you have to trade off speed for accuracy.

In all fairness, the BBC Micro has done very well with 10 bits accuracy and a 10 mS conversion speed. But, good as it is, it will not cope with all situations.

In the case I've just mentioned it is not fast enough to display an audio frequency waveform. There are other applications which we will meet later on in the Bodybuilding Course where a faster A/D converter is needed. So for this month's exercise we will look at how to add one to your micro.

The fast A/D converter board plugs into the user port and enables signals to be digitised over a range of ± 5 volts. Each sample takes about 15uS to acquire, and is of 8 bits accuracy.

You see we have traded speed for accuracy. With 8 bits we can get a

# By MIKE COOK

number from 0 to 255 whereas with the built-in converter we can have 0 to 1023.

Although the Basic ADVAL command returns a number between 0 and 65,536, there are only 1,024 significant increments.

So the built-in converter is four times more accurate but about 600 times slower.

The built-in A/D converter uses a technique known as a dual-ramp conversion process.

This is a very good way of getting a very accurate conversion but it is notoriously slow. In fact the one in the BBC Micro is the fastest one I have come across.

We will be covering the dual ramp

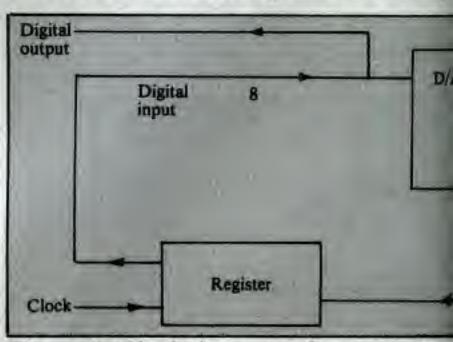


Figure I: Block diagram of a successive approximation A to D converter

process in a later article, so we will leave it there for the moment.

The A/D converter I have used here uses what is known as a successive approximation process. Most of the required components are on one chip, the Ferranti ZN427.

Successive approximation is a technique you may be familiar with, but you may not know it by that name.

Most people owning a computer must have played a number guessing game at some time or other.

It is the one where a computer guesses a number and you have to match it.

After each guess you enter you are told whether you are high, low or just right.

You start off just guessing wildly but pretty soon you develop a successive approximation technique.

Suppose the number is in the range 1 to 100. Your first guess should be 50, half the range.

If your guess is too high the number must be between 1 and 50. So your next guess should be 25, again half the range.

You can continue halving the range and eventually you are bound to find the correct number.

The successive approximation A/D converter works in a similar way. The block diagram is shown in Figure I.

An unknown voltage is presented at the analogue input. This feeds into a comparator.

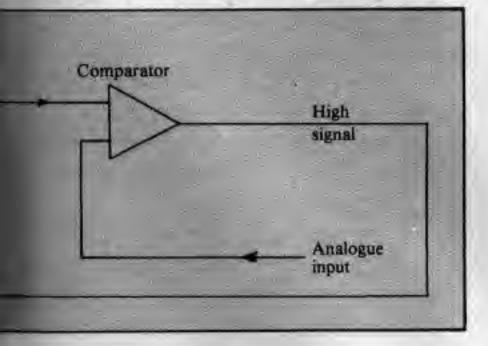
A comparator is simply an amplifier with two inputs whose output is high or low depending on which input has the higher voltage.

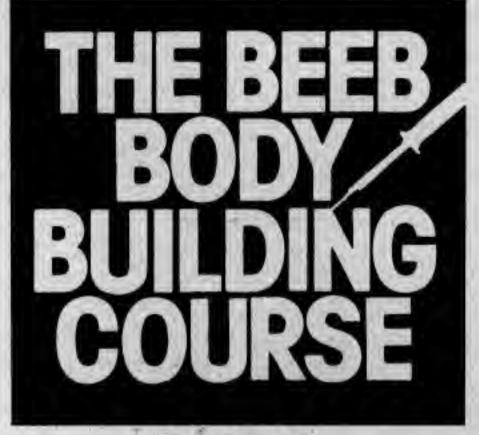
The second input is taken from a D/A (digital to analogue) converter.

As the name suggests this takes a digital number and converts it into a voltage. The register then makes a guess at the voltage by chosing the mid-point.

This is represented by the most significant bit of the digital input being high and the rest low.

The output of the comparator is fed back into the register which then decides whether to keep that bit high (if the input





# PART 13

voltage is in the upper half of the range) or set it back to low (if it is in the lower half).

The register does this for each bit in turn in order of decreasing significance (bit 6, then bit 5 and so on).

After it has made the decision on all 8 bits, the number it is left with represents the value of the input voltage.

Note however that these are in arbitrary units and are relative to the maximum voltage produced by the D/A converter.

This does not matter in many applications as all we want is a number proportional to the size of the input voltage.

The speed of conversion is governed by a clock signal.

The slowest unit in the circuit is the

comparator and the clock has to be sufficiently slow to allow it to settle.

However, as only one clock cycle is needed for each bit of accuracy (plus one to start it off) the technique is very fast.

Figure II shows the complete circuit of our fast A/D board. You will notice that as well as the ZN427 there are some other components.

The A/D chip needs feeding with a clock signal to govern its speed of operation.

This is generated by IC 2 which is a 74LS13 consisting of two 4-input Schmitt input NAND gates.

One gate is wired up as a relaxation oscillator and basically it acts as an inverter.

When there is a logic one on all the inputs, there is a logic zero on the outputs.

Conversely, when there is a logic zero on one or more inputs there is a logic one on the output.

The gates have what is known as a Schmitt input, where the threshold voltage on the input – that is the voltage needed to make the input a zero or one – depends on what logic level is currently on the output.

This difference in threshold is known as the input hysteresis.

The oscillator works by connecting

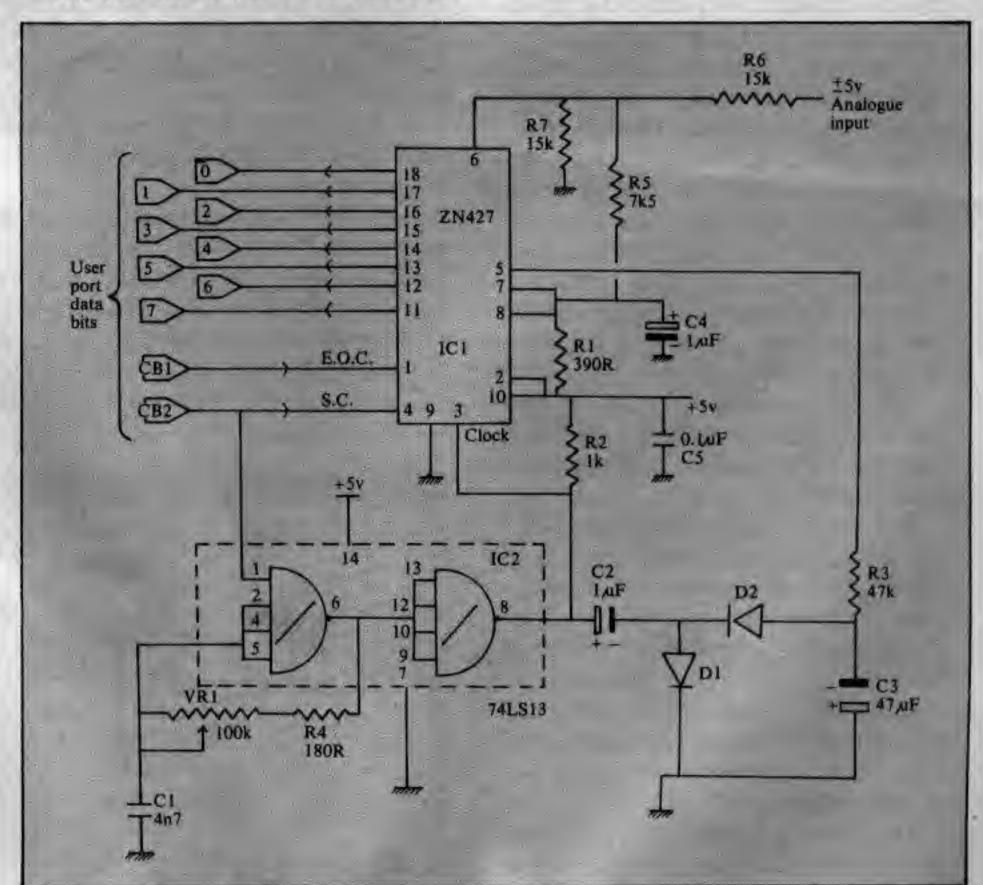


Figure II: Circuit of the fast A/D

# From Page 123

the output back to the input.

If the input is low then the output must be high. But if the output is high then the input is high therefore the output must be low!

What actually happens is that the logic state of the output constantly changes or oscillates.

If there were just a direct connection between input and output the frequency of oscillation would be determined by the propogation delay of the gate.

The propogation delay is the time it takes for a change on the input of a gate to affect the output.

This alone would produce an output of too high a frequency and so we have to introduce an extra delay. This is done by using a capacitor from the inputs to earth and a resistor in the feed-back path.

So as the voltage on the output goes high the capacitor will start to charge through the resistor until it reaches the positive threshold point where it switches the output to low.

The capacitor then starts to discharge through the resistor until the negative threshold point is reached when the output goes high again.

This produces a fixed frequency clock signal on the output of the gate, shown in Figure III.

The resistor is split up into a fixed and variable resistor to allow the clock frequency to be altered slightly.

The ZN427 has a guaranteed conversion time of 15uS but, like all devices, can run slightly faster.

The speed depends on fine variables in the manufacture such as the exact purity of the semiconductor, the stray capacitance and what the machine operators had for lunch!

So by including the variable resistor you can get your converter working at its limit.

The second gate in the 74LS13 package is used to clean up the signal produced by the oscillator and provide a fast rise-time.

This clock signal is fed to the ZN427 and controls the conversion process.

The conversion is begun by applying a negative pulse to pin 4. This is known as the "Start of Conversion" signal or SC.

According to the data sheets, the positive edge of the SC pulse should not occur within 200nS of the falling edge of a clock pulse.

To ensure this, the SC pulse is also wired to the oscillating gate and when it goes low will force the output of the

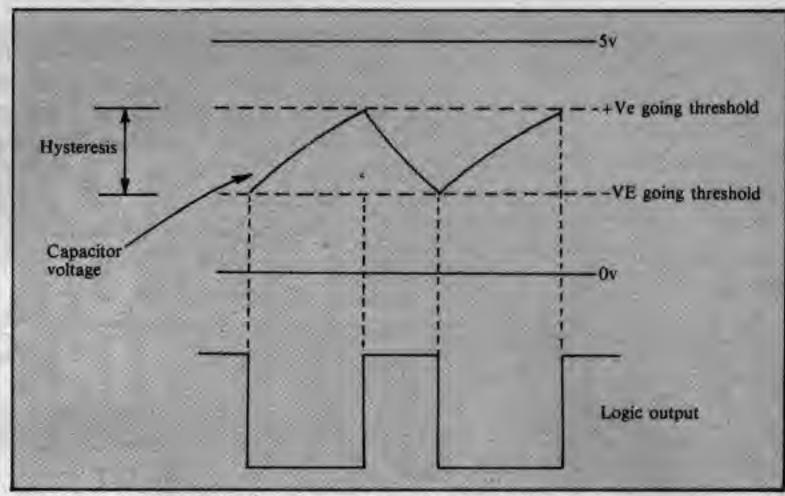


Figure III: Waveforms of a relaxation oscillator

clock to go low also. When the SC goes high the oscillator will start again.

The SC pulse is wired up to the CB2 control line which can be made to pulse every time a number is written to the B side of the VIA.

As all the VIA data pins will be inputs this is known as a dummy write as it does not matter what is written only that something is written.

When the conversion has been completed the EOC line (end of conversion line) makes a positive transition.

This is connected to CB1 and can be made to generate an interrupt or set a flag.

In Basic programs, however, it is not necessary to look at this as the delay between starting off a conversion and getting the results is longer than the conversion time itself.

In order to make any form of A/D or D/A conversion it is necessary to have a voltage reference.

This is a voltage against which everything is measured.

The ZN427 has a built in voltage reference. But if you want to put your own in this can be done on pin 7. It should be in the range 1.5 to 3.0 volts.

This is useful when several A/D

converters are being used so that they all have the same reference point.

The input circuitry consists of resistors R5-R7 which are arranged so that when the input is at earth, R6 is in parallel with R7.

As the latter pair are the same value (15k), their total resistance is halved (7k5), forming a potential divider with R5 to present half the reference voltage to the converter's input.

If the input goes below earth (negative) then the voltage on the input will drop below half way. Similarly when higher than earth it will rise to above half way.

The limits of conversion should be reached with the input voltage at ± 5 volts.

As there are resistors in the input circuitry you would have to supply in excess of  $\pm 10$  volts to do the chip any damage.

The only fly in the ointment is that the comparator in the A/D chip needs a negative supply.

This could be taken from the auxiliary power socket on the BBC computer. But there is a better way.

As the current needed on this negative supply is very small it is possible to generate it from the positive supply.

As we already have an oscillator running it is fairly easy. We use something called a diode pump to generate a negative supply. Consider the circuit in Figure IV.

The capacitor has one side connected to +5 volts and the other side to earth through a resistor. Therefore there is a voltage across the capacitor and thus it has a charge stored in it.

If one end of the capacitor suddenly drops by 5 volts then the other end must also drop by 5 volts because instantaneously there is no change in charge.



So as one end drops from 5 volts to 0 volts the other end must drop from 0 volts to -5 volts.

The capacitor will then start to discharge through the resistor.

When the capacitor is discharged (no voltage across it) the input end is taken quickly to +5 volts again.

The other end responds by trying to rise to +5 volts to preserve the charge or lack of it. However the diode D1 then starts to conduct and rapidly charges the capacitor again.

This diode is said to clamp the capacitor to earth.

In Figure II diode D1 acts in the same way with diode D2 preventing any of the negative voltage getting back to the capacitor.

Therefore the capacitor pumps charge into the circuit which is stored in C3, producing our negative supply.

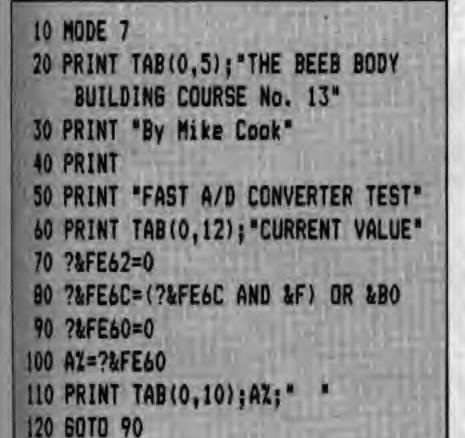
An alternative explanation is that if you waggle one end of a capacitor and clamp the other to earth you will get the inverse of the waggling at the clamped end.

To be honest that's the way I think of it as it is so much easier.

So with the circuit explained we can get on with the construction.

You can make it on Veroboard and connect it up to the user port using Body Build packs 1 and 2. That's the way I constructed the prototype.

Alternatively Body Build pack 10 contains all the parts and a printed



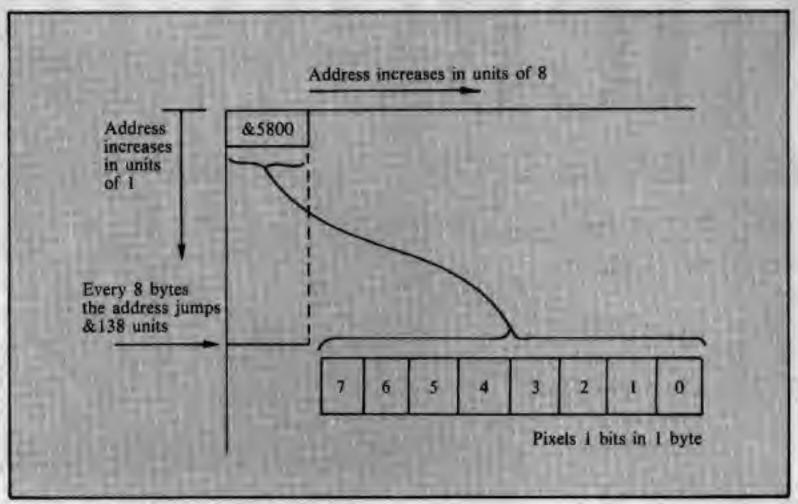


Figure V: Mode 4 address/pixel positions

circuit board.

You will still need a cable (Pack 2 or similar) to connect it up to the user port.

Just identify the component numbers on the screen printed circuit board with the component list or diagram and solder away.

The capacitors are marked with a + and the diodes are marked with a band to help you insert them the correct way round.

Having constructed it, the program in Listing I should test it out. Line 70 ensures all the data lines on the user port are inputs. Line 80 sets the CB2 line to give a SC pulse when written to without affecting any control lines for the printer (side A of the VIA).

Line 90 starts the conversion, which is completed by the time line 100 is executed.

The result is plotted on the screen and the program then loops to get another sample. Forgive the GOTO but I have not been feeling well lately.

Run the program and apply a voltage to the input. As this voltage changes the number should respond.

Now to put it to some serious use. We could arrange the converter to generate an interrupt every time a conversion is completed just like the built in converter.

But, as the conversion time is very short, the computer would spend most of its time getting samples and you

a BBC! So we are only going to use it when it is necessary.

The program in the listing starting on Page 127 is for a digital storage oscilloscope using the fast A/D converter.

It can show signals quite clearly up to 2 KHz in real time and display even faster changes in the expanded mode.

The program works by first gathering 256 samples as fast as it can and storing them in memory. While it is doing this the interrupts are disabled so that the time between each sample is constant.

It then displays these samples as a dot plot, at the same time rubbing out the dot from the previous scan.

At first I tried using the operating system OSBYTE calls. This resulted in the program taking too long to run. The display was not updated fast enough.

So I had to write the program so that it altered the display by writing directly to memory.

To do this we need to know how the pixels on the screen relate to the memory locations. This changes depending what mode you are using.

I have written the program to use Mode 4 and it cannot easily be changed.

Figure V shows the relationship between address locations and screen position.

Each bit in a byte corresponds to one pixel. So if we set bit 7 in memory location &5800, the top left hand pixel will come on.

As we move down the column the address location increases by one until it reaches &5807 and then the address jumps by &138. So the one under that is at address &5940.

In the X direction the address increases in steps of 8 from the first column.

It is obviously time consuming to make the calculation from an X-Y

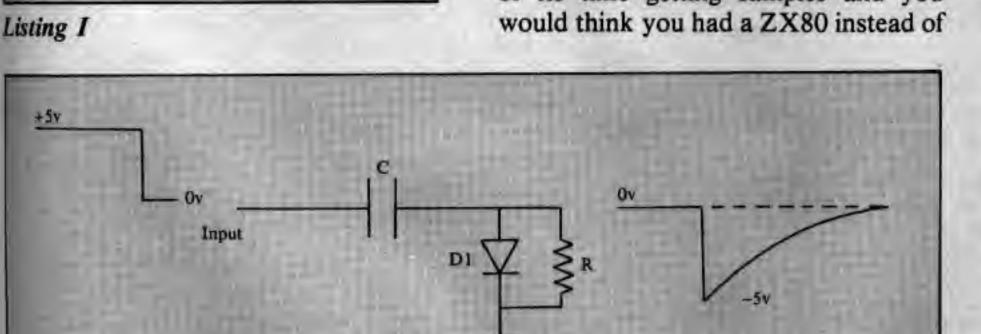


Figure IV: The voltage transitions on a capicitor

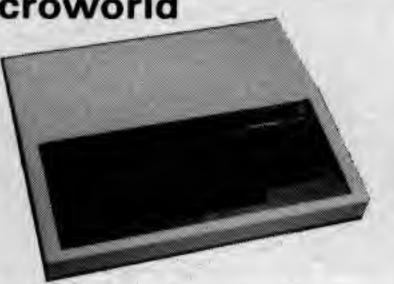
# MICROWORLD



# SCOTLAND'S ONLY EXCLUSIVE BBC MICRO DEALER

# **EDINBURGH Microworld**

12 Leven Street
Tollcross
Edinburgh
031-228 1111
Telex 72355 CLACON G



Model B with latest 1.2

Operating System ...... £399.00

Model B with Disc Interface ... £469.00

Model B with Econet ...... £446.00

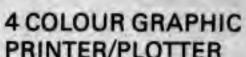
ALL EX-STOCK

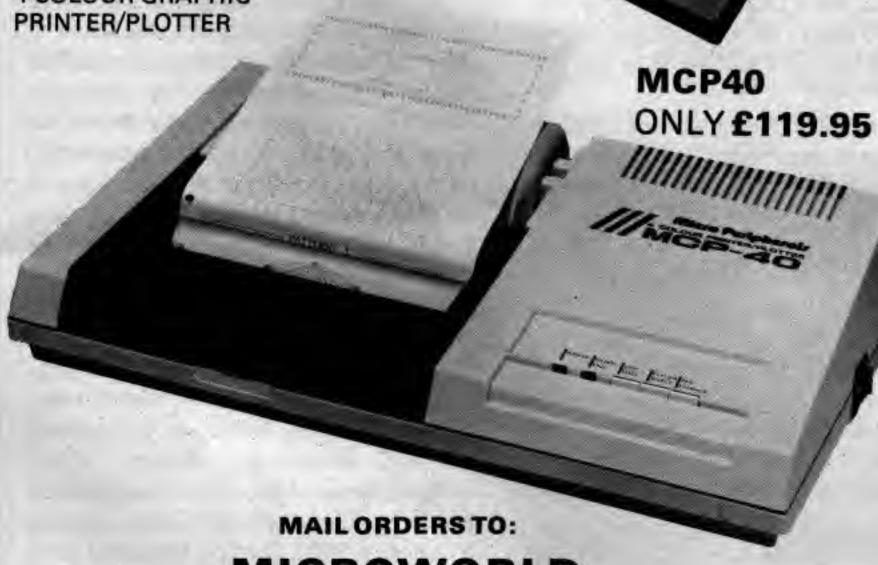
# SHINWA-CTI CP80

FULL FEATURED 80 COLUMN MATRIX PRINTER (FRICTION AND TRACTOR FEED)

ONLY £249 INC. VAT, CARR. £6

**FULL ONE YEAR WARRANTY** 





# MICROWORLD

(Authorised BBC Dealer and Service Centre)
12 LEVEN STREET, EDINBURGH,
(Nr. Kings Theatre, Tollcross)
TEL: 031-228 1111 (M-S 9-5.30)

Carriage £6 per item, all prices include VAT, please check price before ordering. Cheques must be made payable to Andrew Whyte and Son Ltd.





DISCOUNTS AVAILABLE, ALSO
COME AND SEE ECONET IN
OUR SHOWROOM

DISTRIBUTORS FOR SHINWA CP80 AND MCP40

# **GLASGOW Microworld**

11 Bath Street Glasgow G2 041–332 1116

# **ABERDEEN Microworld**

77/83 Holborn Street Aberdeen OPEN SOON!

# **DISC DRIVES**

# **ALLTEAC SLIMLINE UNITS**

Single Drives	
40 track 100K Cumana CS100	£225.00
40 track 200K	
40/80 track 200K	£207.00
40/80 track 400K	£345.00
80 track 200K Cumana CS200	

# **Dual Drives**

40 track 200K	 £375.00
40/80 track 400K	 £430.00
40/80 track 800K	 £600.00

Prices include leads, formatter, manual and P.S.U.

# MICROWORLD DISC DRIVES

MW 400K 40/80 track switched .. £345.00 MW 800K 40/80 track switched .. £515.00 Above include P.S.U. format disc manual and fit under BBC (Torch style)

# PRINTERS

	- Common and the
Shinwa CP80	£249.00
Seikosha GP100A	£215.00
Seikosha GP250X	£271.00
Seikosha GP700 4-colour	£425.00
Epson FX80	£415.00
Epson RX80	£279.00
Epson RX80F/T	£315.00
Juki 6100	£415.00
Silver Reed Daisywheel only	£315.00
MCP40 colour printer/plotter	£119.95
Interface Cable for above	

# MONITORS

Sanyo 14" colour	£225.00
Sanyo 14" colour med. res	
Sanyo 14" colour high res	
Microvitec 14" colour	
Novex 12" amber	
Zenith 12" green	£85.00
Sanyo 12" green	
BMC 12" green	The second secon
RMC Turntable	

SOFTWARE: Full range of ACORNSOFT, IJK, MICRO-POWER, SUPERIOR SOFTWARE, ALLIGATA, GEMINI, plus good range of EDUCATIONAL software. Please call or SAE for list.

(Add 50p post per order.)

# From Page 125

co-ordinate location to an address for each point plotted. So we do most of the calculations beforehand and store them in a look-up table.

This look-up table of the address of the first byte in each column is performed in lines 220 to 280.

The most significant byte is stored in a table starting at address &5700, and the least significant byte in a table at &5600. It is more convenient to split the values up in this way.

As we are plotting every possible X value we have to keep track of the number to add to the first column address.

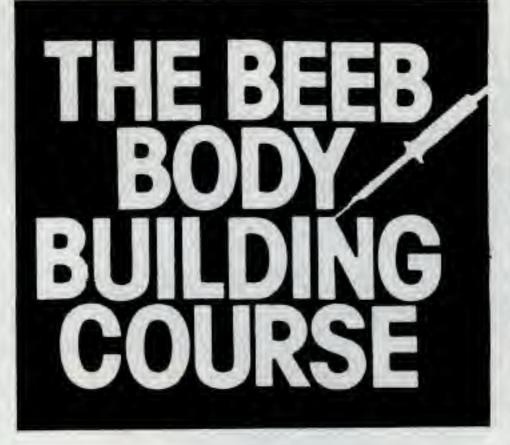
A mask with a single bit in it is stored at &86 to tell us which bit in the pixel to change.

Whenever we plot a bit we store the address in a table (&5400) so that the next time round we can use the address directly to erase the point.

The first time the routine is entered there is no point to erase and so this table is filled with dummy points in the procedure WIPE. The addresses used are in ROM and so nothing will be affected.

This results in a very fast and responsive display. Try to alter the speed of the clock oscillator so that the data is gathered as fast as possible.

In order to view a stable trace it is necessary to start taking the samples from the same point on the waveform



each scan.

This is made possible by supplying a trigger or threshold point.

The waveform must cross this point on a rising edge to trigger the data scan. If the waveform never reaches this point then there will be no display and the only way out is to press Break.

When the trigger point is set to zero there is no waiting, the scan proceeds immediately.

By pressing the space bar the trace can be frozen. You can then alter the trigger point or expand the scale of what you have. The dots may be isolated or joined up.

The scale factor may be any integer from 1 (no scaling) to 100 (quite a lot). The display always starts from the trigger point. You can make this a variable as well if you like. It is found in line 1290.

Well that just about raps it up for this month. Like all projects it is just a starting point for you.

You can calibrate the data capture rate so that you can guide a cursor through a frozen display and have a read-out of the time and amplitude at that point.

You could even include more complex triggering such as negative slope and delayed triggering. It is up to you. The hardware is there. It's just a matter of software.

The applications of this board are not just limited to displaying waveforms. I already have at least two projects in mind that will use this board so you should get your money's worth from it.

Well I'm not superstitious, but it's nice to get number 13 out of the way. See you next month.

Body Build Pack No. 10 consists of:

IC1 ZN427 A/D converter; IC2
74LS13 NAND Gate; R1 390R;
R2 1k R3 47k; R4 180R; R5 7k5
1%; R6 15k 1%; R7 15k 1%; VR1
100R preset; C1 4n7; C2 1uF
electro; C4 1uF tant; C5 0.1uF
disc ceramic; D1 D2 1N4148
diodes; 18 pin IC socket; 14 pin IC
socket; 20 way IDC Header; Fast
A/D printed circuit board; 3 way
terminal strip.

• You can order this pack and previous ones with the order form on Page 132.

# Oscilloscope listing

10 MODE 4

20 HIMEM =&52FF

30 DIM CODEX &90

40 PRINT TAB(0,5); "THE BEEB BODY BUILDING COURSE"

50 PRINT "Number 13 March 1984"

60 PRINT

:PRINT

70 PRINT "By Mike Cook"

BO PRINT

90 PRINT

100 PRINT "FAST A/D CONVERTER OSCILLO SCOPE"

110 PRINT

120 PRINT "PRESS ANY KEY TO START"

130 A\$=GET\$

140 PRINT

150 PRINT "INITIALISING"

160 ?&FE62=0

170 ?&FE6C=(?&FE6C AND &F) OR &BO

180 ?486=480

: ?&80=00

: ?&81=00

190 ?&FE6E=&90

200 M%=&5600

210 FOR AX=0 TO 31

220 FOR BX=0 TO 7

230 TX=AX\*&140+BX+&5800

240 ?MX=TX MOD 256

250 MX?&100=TX DIV 256

260 MX=MX+1

270 NEXT

280 NEXT

290 FOR 1%=0 TO 3 STEP 3

300 PX=CODEX

This listing is included in this month's cassette tape offer. See order form on Page 169.

310 E

320 OPT 12

330 .START SEI

340 LDA &81 \GET TRIGGER VAL UE

350 CMP #0

360 BEQ NTRIG \TO NO TRIGGER POINT

370 \WAIT FOR A POSITIVE TRANSITION OF THE TRIGGER POINT

380 .TLOW JSR SGET \LOOP TILL BELOW TRIGGER

390 CMP &81

400 BCS TLOW

410 .THI JSR SGET \LOOP TILL ABOVE

TRIGGER

420 CMP &81

430 BCC THI

440 .NTRIG LDX #0

Turn to Page 130



# PRINTERS



Seikosha GP100A Silver Reed EX500	• •	•	• •					•			100	238.05
Parallel	• •				*					*		343.85
Serial												378.35
Parallel						 						534.75
Serial												
Epson RX80												
Epson FX80					÷.							503.70
Epson RX80 (F/T)					ı				ı	ì		366.85
Epson MX100 (B2 Col	)											546.25
Epson FX100												

Whether its your first computer or whether you're already an enthusiast, LVL COMPUTERTOWN offers you the quality of service you expect from experts. If you invest money, you go to a bank or a broker - a specialist who can guide and advise you on the best return for your capital. At LVL COMPUTERTOWN we're specialists too. We're there to help guide you through the micro maze, keep you up to date on innovations, help you get the best value for money, whether your computer is for you, your children or your business. Your computer can change your life - make sure you change it for the better:

Come and talk to the experts and move into micros with LVL

**COLOUR LIGHTPEN** 



The lightpen is compact, reliable and comes in a rugged metal case providing physical and electronic protection. Its sensitivity can be adjusted to match any make of TV screen, giving the highest levels of accuracy.

COMPUTERTOWN

The lightpen package consists of the lightpen, an interface unit, introductory software on cassette and a user guide. £45.95



BBC

MICROCOMPUTER

MODEL B ..... £399

MODEL B with ECONET £446

MODEL B with DOS .... £469

Model B with DOS & ECONET

MODEL A

# MONITORS



SABA 14" COLOUR MONITOR/COLOUR TV.

£274.45

MICROVITEC 14" Colour Monitor £247.25

# DECCACOLOUR

14" Colour Monitor £247.25



12" Green Screen £102.35

# CASSETTE RECORDERS





# REFLECTION SUPERIORIT

The Bell & Howell/LVL Computer Compatible Data Recorder

- O Automatic Level Control
- O Automatic Tape Stop
- O Tape Counter
- O Remote Motor Control

\* IT'S A PORTABLE COMPUTER TERMINAL! \* IT'S A LETTER QUALITY COMPUTER PRINTER \* IT'S A FULL FEATURE ELECTRONIC TYPEWRITER

Philosophers Quest ..... £9.95

# SOFTW DESIGNED FOR THE BBC Countdown to Doom ..... £9.95 Sphinx Adventure ...... **MICROCOMPUTER**

LANGUAG	Đ	S							
LISP									£16.85
FORTH									£16.85
GAMES									
Monsters .									£9.95
Snapper									£9.95
Planetoid .									£9.95
Arcade Actio	or	1							£11.90
Rocket Raid									£9.95
Meteors									£9.95
Arcadians .									£9.95
Sliding-Block	C	Pı	12	Z	le				£9.95
- 14 Table 1									

LANGUAGES LISP £16.85 FORTH £16.85 GAMES	GENERAL Desk Diary £9. Creative Graphics £9. Graphs & Charts £9.
Monsters         £9.95           Snapper         £9.95           Planetoid         £9.95	Tool Box £21. Record Keeper £13. Magic Garden £9.
Arcade Action £11.90 Rocket Raid £9.95	EDUCATIONAL
Meteors £9.95	Map References £7.
Arcadians £9.95	
Sliding-Block Puzzle £9.95	Classmaster £20.
Cube Master £9.95	Algebraic Manipulation, £9.
Starship Command £9.95	Word Sequencing £11.
Snooker	
Super Invaders £9.95	
Hopper £9.95	Word Hunt £11.
Colditz £9.95	Density Circuit £11.
Doctor Who £10.00	"교육하는 항공 <b>경</b> 에 다른 프라이지를 하는 때 가게 하는데 있다. 모든 보다 보다 다
White Knight II £10,00	
Missile Base £9.95	Jars £11.
Draughts & Reversi £9.95	

ADVENTURES

Castle of Riddles

# GENERAL Programing for the BBC . £8.95 Advanced User Guide . £12.95

ACORN									
Creative Gra	pl	ni	C	S				£7.50	
Graphs and C	_								
Forth Book								£7.50	
Lisp Book .									
View Guide					ì		į.	£2.50	
Into View .									
BCPL Uger M									

# BBC

The Computer Book	£6.75
The Book of Listings	£3.75
30hr. Basic	£5.95
Beyond Basic	£7.25
The Friendly Computer .	£4.50
Sound & Graphics	£7.95



The items featured represent a very small selection from our vast product range.

Further information of both product and services available can be obtained by telephoning or visiting your nearest LVL Computertown Dealer.

C-TECH SOFTWARE 184 Market St

## HYDE

Cheshire 061 366 8223

 COMPUTER CITY 78, Victoria Rd

# WIDNES

Cheshire

051 420 3333 OAKLEAF COMPUTERS

#### 100. Boughton CHESTER

0244 310099

# CUMBRIA

THE COMPUTER SHOP 56/58 Lowther St.

# CARLISLE

Cumbria 0228 27710

A.C.L.

# 1. Northmall

GRAYS, ESSEX

0375 79834 BROADWAY MUSIC

AND VISION Woodford Green

ESSEX

01 504 7500

# GREATER MANCHESTER

LOMAX 8 Exchange St St Annes Square

MANCHESTER

061 832 6167

# WORC S

SPURTREE COMPUTING LTD Council Buildings

Teme Street. TENBURY WELLS.

Worcestershire

.95

.95

.95

.80

.95

.00

95

.90

.90

.90

.90

.90

.80

.80

.90

£16.10

# 0584 811353 811304

# MERSEYSIDE

\* THORNGUARD 46, Pensby Rd.

HESWALL The Wirral,

Merseyside 051 342 7516

BASIC BUS SYS

#### Trent Boulevard WEST BRIDGFORD

Nottingham 0602 819713

S P ELECTRONICS

#### 48 Linby Rd. HUCKNALL

Notts. 0602 640377

LEASALINK VIEWDATA Ltd.

230, Derby Rd

# STAPLEFORD

Notts.

0602 399484

# OXFORD

ABSOLUTE SOUND AND VIDEO (Oxford) Ltd. 19 Old High St. Headington

OXFORD 0865 65961

# AVON

K & K COMPUTERS 32, Alfred Street.

# WESTON

SUPERMARE Avon

0934 419324

COLSTON COMPUTER CENTRE LTD

The Colston Centre.

11 Colston Ave.

BRISTOL

# 0272 276619

# WARWICKSHIRE

CARVELL

9. Bank St

RUGBY

Warwickshire 0788 65275

# WEST MIDLANDS

RICHARD MORRIS 523. Bearswood Rd.

### Smethwick

WARLEY 021 429 1161

IBC MICRO SERVICES 200 Earlsdon Ave.

Nth. Earlsdon

COVENTRY

0203 73813

## WILTSHIRE

WILTSHIRE MICRO

CENTRE

Unit 6.

Central Trading Estate.

Signal Way.

Old Town.

SWINDON 0793 612299

# BUCKS

HI-VU ELECTRONICS

### 38 Church St Wolverton

MILTON KEYNES

Bedford

0908 312808

# SUSSEX

CIE MICROS

78 Brighton Rd

WORTHING West Sussex

0903 213900

# ISLE OF WIGHT

EXCELL

4 Foreland Rd

BEMBRIDGE

Isle of Wight 098 387 2578



# HEREFORD

KEMPSONS 26. St. Owen St HEREFORD

## 0432 273480

KENT KENT MICRO

# 57 Union St.

MAIDSTONE Kent

0622 52784 GRAVENSEND

COMPUTERS 39. The Terrace. GRAVESEND

## 0474 50677 NORTHANTS'

M A ELECTRICAL

T High St

IRLINGBORO N'Hants

#### 0933 650133 LEICESTER

PERCY LORD & SON

63 Blaby Rd

WIGSTON Leicester

# 0533 785033

OAKLEAF COMPUTERS

121 Dudley Rd GRANTHAM

114 H 31.7H

LONDON CANNONBURY RADIO

#### 185 Upper St ISLINGTON N1 London

01 226 9392 PAUL ELECTRICAL 250/2 Grand Drive Raynes Park

LONDON SW20

WOODS RADIO 297. Lavender Hill Battersea.

LONDON

01 228 1768

01 542 6546

MEDLICOTT BROS

53 Mardol SHREWSBURY

Shropshire

## 0743 3060

STEMERY & CO.

10 Market Place BUNGAY.

Suffolk

## 0986 2141

IRELAND EVERYMAN COMPUTER

# SERVICES

BALLYMONEY Co-Antrim N Ireland

026 56 62658

NEWBURN ELECTRONICS

BALLYCARRY Co Antrim.

#### 09603 78330 STAFFS

W BAGNALL

18 Salter St

STAFFORD 0785 3420

#### KIRKLANDS City Rd Fenton

STOKE ON TRENT 0782 415787 COMPUTERAMA

59 Foregate St STAFFORD

0785 41899 SURRE

#### HASLEMERE COMPS 25, Junction Place HASLEMERE

Surrey 0428 53850 P & H ELECTRONICS

S. The Parade. Reading Road,

VATELEY Surrey.

\* Spectrum Members

0252 - 877 222

# LANCASHIRE

P V MICROS

38A Water St ACCRINGTON

Lancs 0254 36521

#### Home & Business Computers Ltd.

54. Yorkshire Street OLDHAM 061 633 1608 Home & Business

Computers (RCH) Ltd 73 Yorkshire Street

ROCHDALE

#### 0706 344654 WALES

BUCON

18. Mansel St

SWANSEA 0792 467980

518

91 Whitchurch Rd

Cyncoed

CARDIFF Wales 0222 621813

THE COMPUTER SHOP 41, The Hayes,

#### Wales 0222 26666

CARDIFF,

SCOTLAND COMMSCOT 30 Gordon St

GLASGOW

041 226 4878

# NORTH LAND NEWTONS

Main St. SEAHOUSES

0665 720307

# ALLIGATA THE SOFTWARE WITH BITE BRINGS YOU

# DAMBUSTERS

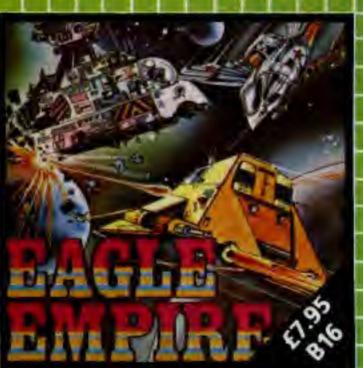
# THE DEVASTATING NEW GAME FOR BBC (Model B)

Alligata presents a superb range of software products that are designed specially for you. Games that cleverly combine full machine code and high resolution, full colour graphics to create hours of fun and excitement. And utilities that have been developed to open new doors and help get the best from your BBC (Model B) micro. If it's to be outstanding quality and amazing value for money then Alligata has to be your choice.

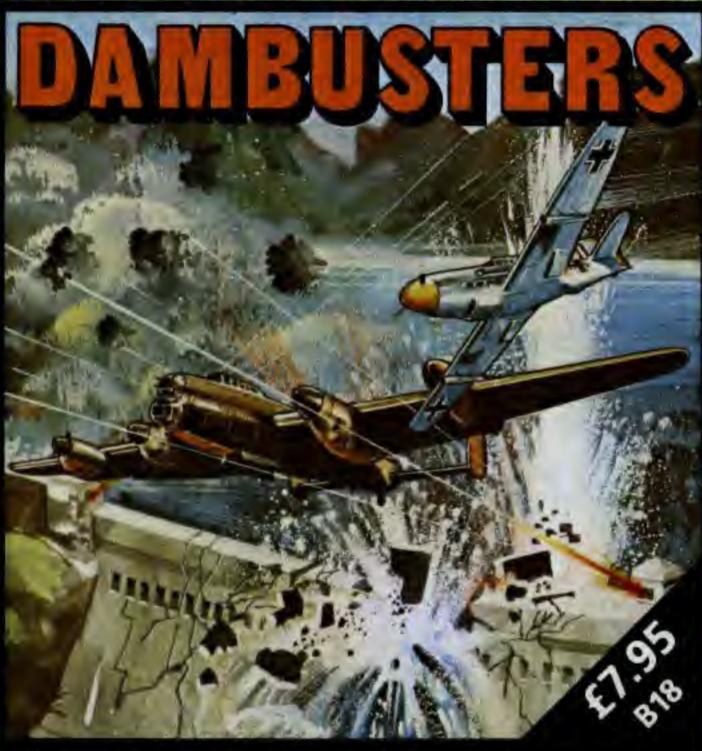
Send a stamped addressed envelope for our full colour catalogue which gives details of the complete range.

# WRITE OR PHONE YOUR ORDER TODAY!

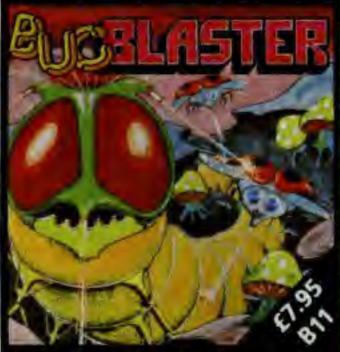
also available from all good software stockists.



Fight your way through four action packed levels of attack from the menacing phoenix and battle armed eagles, before you can blast to destruction the heavily armoured and strongly defended Eagle Empire



Harried by night-fighters, bombarded by heavy antiaircraft fire pilot your bomber through the treacherous valley and deliver the revolutionary bouncing bomb on its path of destruction.



A superb action packed arcade special. A really fast implementation of the splendid 'centipede.' Features include spiders, mushrooms, centipedes and the mushroom poisoning scorpion affectionately known as 'Brian.'



Qualify in under 60 seconds for the race of a lifetime – fantastic speeds, death defying manoeuvres and a narrowing circuit – an exacting challenge for a future world champion.

# COMPETITION WIN A TRIP TO GERMANY

The highest scoring player on Dambusters will win a free holiday in Germany accompanied by a friend. Full details and entry form are available with every Dambusters program. So hurry, get your copy today and start practising.

# ALSO AVAILABLE

# B19 NEANDERTHAL MAN £7.95

Relive the dangers of primitive man

— whilst foraging for food for your
family you've only a spear to protect
your family from the prehistoric
monsters.

# B07 LUNAR RESCUE £7.95 Land your moon buggy and rescue a precious cargo, destroying all opposition on the way; finding your

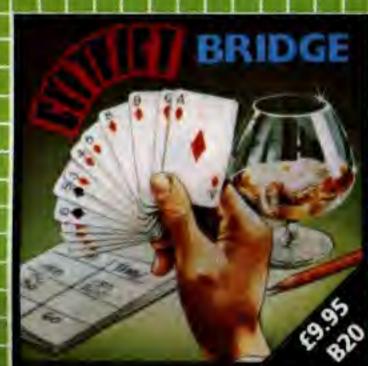
opposition on the way, finding your way back to the mother ship start again against greater odds.

B12 PRIMARY ART £7.95

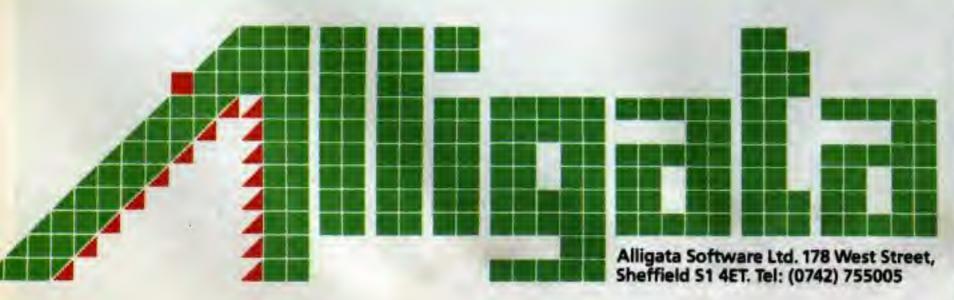
Create a picture to be proud of –
place pre-programed shapes in any
position, any size or any colour.
Features free-hand drawing and
animation effects.

# B03 DMON £7.95

Disk £11.95 ROM £19.95
A superb machine code monitor and disassembler available on BBC. Features: Full disassembler with ASCII dump, full hex dump with ASCII, reads any ROM, edits any byte of RAM, and many more.



The ideal opportunity to improve your technique in a sophisticated program where the computer bids and plays the other three hands



Despatch is normally made on receipt of order and should reach you within 7 days.

THE RESERVE THE PERSON NAMED IN COLUMN 2 I	OGRAMS REQUIRED
B18 B16 B11 B15 B	B200 B190 B070 B120
enclose cheque/PO* for £	Charge my Access/Visa £*
Card No.	Signature
Name	
Address	

\*payable to Superior Systems Ltd., 178 West Street, Sheffield S1 4ET.

# From Page 127

450 \READ IN 256 SAMPLES 460 .SAMP JSR SEET 470 STA &5300,X

470 51H &3300

480 DNC

490 BNE SAMP

500 CLI

510 \DISPLAY SAMPLES

520 .SLINE LDX #0

530 STX &87

540 .LOOP LDX &80

550 \GET ADDRESS OF POINT TO ERASE

560 LDA &5400,X \GET LSB OF ERASE POINT

570 STA &82

580 LDA &5500.X \GET MSB OF ERASE POINT

590 STA &83

600 LDA &5300, X \GET VAL UE TO PLOT

610 EOR #&FF \INVERT TO COMPENSATE

620 TAY

630 LDA &5600,Y \LOOK UP LSB OF FIRST COLUM

640 CLC

650 ADC &87 \ADD X VAL UE

660 STA &84 \STORE MSB OF PLOT ADDRESS

670 STA &5400, X \STORE ERASE ADDRESS

680 LDA &5700,Y \LOOK UP MSB OF

FIRST COLUM

690 ADC #0 \ADD X VAL UE

700 STA &85 \STORE MSB OF PLOT ADDRESS

710 STA &5500, X \STORE ERASE ADDRESS

720 LDX #0

730 KREM OVE OLD POINT

740 LDA (&82,X) \GET OLD DISPLAY

BYTE

750 EOR &86 \INVERT APPROPRIATE

BIT

760 STA (&82,X) \WRITE TO SCREEN

770 \PLOT NEW POINT ON THE SCREEN

780 LDA (&84,X) \GET DISPLAY BYTE

790 OR A &86 \SET APPROPRIATE BIT

800 STA (&84,X) \WRITE TO SCREEN
810 \MOVE POINTERS TO NEXT X POSITION

820 INC &80 \X PDINTER

830 ROR &86 \PIXEL MASK

840 BCC LOOP

850 LDA #&BO \RESTORE MASK BIT

860 STA &86

870 LDA #7 \ADD 8 TO X VAL UE

# THE BEEB BODY BUILDING COURSE

880 ADC &87 \IT IS 8 AS CARRY IS

SET

890 STA &87

900 BNE LOOP \LOOP IF NOT FINISHED

ALL POINTS

910 LDA #129

920 LDX #49D

930 LDY M&FF \TEST FOR SPACE BAR

940 JSR &FFF4

950 TXA

960 CMP WAFF

970 BNE START

980 RTS \FINISH WHEN SPACE PRESSED

990 .SGET LDA #410 \SUBROUTINE

TO BET A SAMPLE

1000 STA &FE60 \START CONVERSION

1010 . HOLD BIT &FE6D

1020 BEQ HOLD \LOOP TILL +VE TRANSITIO

N OF CBI

1030 LDA &FE60

1040 RTS

1050 ]

1060 NEXT

1070 CLS

1080 VDU 24,0;0;1023;1023;

1090 VDU 28,32,31,39,0

1100 CL6

1110 PROC\_SETUP

1120 PRINT "Expand"

1130 PRINT "Trigger"

1140 PRINT "Run"

1150 PRINT "?";

1160 A\$=GET\$

1100 MP-0019

1170 IF A\$="R"

THEN PROC WIPE

:PROC\_SETUP

:PRINT "RUNNING"

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

:CALL CODEX

:PRINT

:PRINT "NOW: -"

:60TO 1120

1180 IF AS="T"

THEN PRINT

: INPUT "VALUE", TX

:7481=T%

:60T0 1120

1190 IF A\$() "E"

THEN 1160

1200 PRINT

1210 PRINT "SCALE"

1220 INPUT SX

1230 IF SZ(1 OR SX) 100

THEN PRINT "TOO MUCH"

:60TO 1210

1240 PRINT "JOINED ?"

1250 A\$=6ET\$

1260 IF As="Y"

THEN JX=5

ELSE J2=69

1270 PZ=45300

1280 CL6

1290 X7=-57#4

1300 MOVE 0, ?P%#4

1310 REPEAT

1320 XX=XX+5X+4

1330 PLUT JZ.XZ.?PZ+4

1340 PX=PX+1

1350 UNTIL XX>1019

1360 GOTO 1120

1370 DEF PROC WIPE

1380 CL6

1390 FOR AZ=45400 TO &55FF

1400 ?AX=&CO

1410 NEXT

1420 ENDPROC

1430 DEF PROC SETUP

1440 CLS

1450 PRINT

1460 PRINT " SCOPE "

1470 PRINT

1490 PRINT

1480 PRINT "TRIG ";?&81

1500 PRINT "SPACE TO";

1510 PRINT " FREEZE" 1520 PRINT " TRACE"

1530 PRINT

1540 ENDPROC



# USING a lightpen really DOES make light work of entering data into your BBC Micro.

Painting on the screen or selecting options comes naturally with *The Micro User* lightpen.

Children in particular find it easy to communicate with a micro this way.

With our ready-assembled lightpen comes full details of how to use it in your own programs PLUS three pieces of software to get you started:

- Pentest to set things up for your own micro.
- Pendraw an enthralling painting program.
- Penbell an entertaining musical diversion.

All in all, The Micro User lightpen is a really versatile add-on for your BBC Micro, with lots of possibilities.

If you're looking for new ideas, try Mike Cook's article on page 141 of this issue. He shows you how to achieve what many people thought impossible – single pixel resolution!

# What the Beeb Body Building packs contain

Upgrade your BBC Micro with these Beeb Body Building Packs.

- Packs 1 and 2: Really use your User Port! These two packs let you safely and simply join your micro to the outside world. The best way to learn about interfacing.
- Pack 3: Give your BBC Micro real data-processing muscle by building yourself a dual cassette system - the way Acorn said you couldn't.
- Packs 4 and 5: Control mains equipment in complete electrical isolation from your micro. Pack 4 is rated at 4 amps, pack 5 at 10 amps.
- Pack 6: All the electronic components you'll need to construct the Micro User light pen, with its special screen-sensing circuit.
- Pack 7: Two fascinating experiments for schools and the amateur scientist: investigate the

behaviour of a pendulum and study capacitor discharge.

- Pack 8: A versatile sound to pattern converter. Its many uses include running a light show with your BBC Micro. It will also make the micro a resident fixture in many music classes.
- Pack 9: Make sure you remember all those vital appointments and anniversaries with the help of this real time clock.
- Pack 10: A high speed A/D for the BBC Micro with many applications. For instance, you can turn your microcomputer into an oscilloscope!

Also available are a fully-assembled light pen, sound-to-pattern converter and real time clock. For a small extra charge constructors who run into difficulty assembling pack 8 can send it in for testing. It will be returned fully operational.

# YOUR ORDER FORM

for the Beeb Body Building packs

# Please send me:

Pack 1 @ £9.95 Pack 2 @ £9.95 Pack 3 @ £9.95 Pack 4 @ £9.95 Pack 5 @ £12.95 Pack 6 @ £13.65 Pack 7 @ £15.50 Pack 8 @ £16.55 Pack 9 @ £28.50

# Described in issue

July 1983 page 83
July 1983 page 83
August 1983 page 85
Sept 1983 page 91
Sept 1983 page 91
October 1983 page 91
October 1983 page 69
November 1983 page 71
December 1983 page 95
February 1984 page 123
March 1984 page 132

Pack 10 @ £24.95 March 1984 page 132

Assembled light pen @ £18.35 October 1983 page 69

Assembled sound to pattern converter @ £22.30

Assembled real time clock £31.00

Testing sound to pattern converter @ £9.70

\*Postage and packing FREE if more than Cheque to

Plus post and packing
Cheque to be made payable to Database Publications
All prices include VAT

No. Amount £ ..... £ ..... £ ..... £ ..... £ ...... £ ..... £ ..... £ ..... £ ..... £ ..... £ ..... £ ..... £ ..... £ ..... £1.00 \*

Total £ .....

	Name
	Address
•	
	DOST TO DOS D 1 144 11
	POST TO: BBC Packs, Micro User, Europ

Stockport SK7 5NY.

Please allow up to 28 days for delivery

Printer Monitor ROM

Watford

THE Watford Printer Monitor ROM is a very interesting new product which positively reeks of Cambridge knowledge engineering.

The BBC MOS – Magnificent Operating System – makes provision for a printer driver routine to be attached to the MOS to which all characters intended for a printer will be sent.

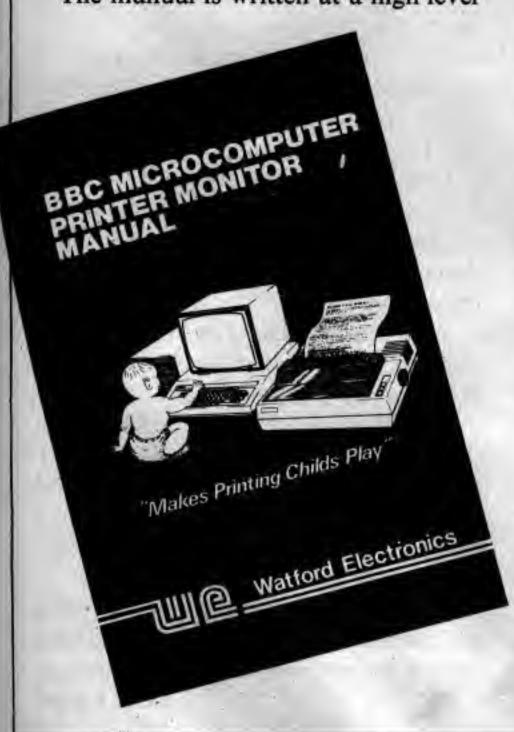
This is to allow printers which either do not conform to the Centronics or RS432 interface standards to be attached to the BBC Micro. Or, as in this instance, to give the printer more intelligence than it was born with.

The monitor performs three functions:

- It can be set up to print with a left margin and top and bottom margins and to provide form feed and other paper feeding commands on printers which do not have these functions built in.
- 2. It will replace multiple, forgettable control codes for the printer's functions by single codes.
- It will print user defined characters –
  provided the printer has a graphics
  mode which can be switched on and
  off in the middle of a line.

The ROM is supplied with a 50 page manual and a function key strip for your printer. The function keys are used to provide manual access to a range of printer functions — form feed, line feed, setting margins, selecting a character set and so on.

The manual is written at a high level



# Give your printer more brains than it was born with

and clearly the author is an expert on the BBC MOS.

However, fascinating though the technical notes are, the non-expert user, and even some who have been publicly exhibited as experts, find it hard going.

It needs quite a lot of digging to get things to work. Using the codes to turn on and off the various printer fonts is quite easy but when it gets on to setting margins it is difficult to find out how it should be done.

Setting up the monitor is however, quite easy. It needs the following commands:

- \*PRAM1 or <1><D><D

  BREAK> to allocate workspace. When using a word processor it is best to choose the private workspace option as it is usually not clear what part of memory which may be free under Basic will also be free under the word processor.
- \*PRINTER < printer code > to select the required set of printer functions.
- \*PAPER66 or \*PAPER72 or \*PAPERCON to choose a form length and top and bottom margins. The latter is for use with word processors and stops the Printer ROM interfering with the word processor's page layout.
- \*MARGIN hh to select a left margin
   0 to be selected when using a word processor.

Using \*HELP STATUS will now show that everything is in order. It will say:

# l private page PMON parallel printer selected.

"1 private page" means that the machine operating system has given it a page of memory which, if the other ROMs are well behaved, will be kept for the printer ROM's use.

"PMON parallel printer selected" means that the printer is being assumed to be connected to the Centronics interface. If this is not so then issuing the command \*FX5,6 will select the serial (RS423 or RS232C) output routines.

The printer monitor is now in control of the printer and every character sent to the printer – selected as usual by VDU 2 or CTRL-B – will pass through the monitor and be checked for job codes.

These are character codes which are not printed as characters but interpreted by the printer monitor as a command.

The job codes are detailed in the appendix corresponding to the printer type selected.

For instance, to use an Epson FX-80 appendix 6, for printer type EPb, gives an introductory discussion of what the printer monitor does and what is left to the printer's own functions, followed by a list of the character codes sent to the printer which are intercepted and interpreted by the monitor.

Without the printer monitor to start printing in italics you would have to send ??? and, what is worse, find it in the manual.

With the printer monitor you simply send code 184 and return to the normal font with the code 168.

The ROM recognises nine printers – Seikosha GP100, Tandy LPVII, DMP100 and DMP200, NEC PC8023 and Epson FX, RX and MX printers.

It will also work with the Seikosha GP80 and Tandy DMP120 but these do not support some of the functions of their more expensive or newer brethren, so the full range provided with the ROM cannot be used.

As has been mentioned before, it can be used with word processors. Unfortunately, although it can be used with Wordwise (using the Output Control code command) it cannot be used with View (with the Highlight commands).

It also seems unlikely that it can be used with Merlin Scribe as only printer codes in the range 0 to 31 can be embedded in Merlin Scribe text.

It is an excellent program though the manual could do with more examples and explanation for the novice user. Even so, to avoid looking up the codes in your printer manual and to be able to print user defined characters this ROM is worth buying.

C.W. Martin

• Since this review was written Watford have announced that a more user friendly version of the manual is shortly to appear. The original manual was only a temporary version.

I HAVE been looking for a handy way of copying graphics from the screen for some time.

As a teacher, the possibilities of children making a hard copy of their work has always appealed to me.

True, I could always load a screen dump program into the computer beforehand. But that did not give me the flexibility I was looking for.

What I wanted was a simple, and fast, way of telling the computer to send the information on the screen to the printer.

Just as I was pondering further on the

# Screen Dump ROM

D.A. Computers

problem, I found an advertisement in this magazine that seemed to fit the bill. It also said that it would magnify the dumped hard copy, too. Needless to say, a cheque went in the post the next day.

After two weeks, a small envelope came winging its way into my class-room.

On opening it I was rather surprised to find another, much smaller, envelope. On opening that, I found a well-wrapped and protected ROM chip.

On the <u>front</u> of the small envelope was a typed label telling me how to get further instructions, once I had fitted the ROM.

After the usual 10 minutes to fit, the ROM was ready to be utilised.

\*H.G. was the command I was told to use, utilising the \*HELP facility. This means that you would need a series 1.0, or later, operating system.

The instructions were, in turn, made into a hard copy by entering Ctrl B before using the \*H.G. facility.

The resulting instructions, delivered in a novel and effective way, were on the whole quite clear.

The information section tells of the effects you can accomplish using the ROM.

It will enable you to print upright or sideways – the latter I have found useful for larger images – in single, double, triple, or quadruple size.

It will also select a portion of the screen, if desired.

BBC modes 0, 1, 2, 3, 4 or 5 can be used. Any printer mode can be used for Epson, Seikosha, CTI, NEC and others.

The syntax section, was not, at first, as clear as it could have been for someone, like myself, who is used to Wordwise.

I was confronted with the following syntax:

\*GDUMP pc sc st mg bg x1 yb xr yt
I admit I was told to follow the
command \*GDUMP with up to nine
numeric arguments. But I nevertheless
continued my \*W. habit of putting
numbers after what I thought to be
command letters.

After three attempts it struck me quite by chance to try just the numbers.

I think, for the slow learners like me, it would have been simpler to have used the term WHERE. That is, where the letters stand for a series of up to nine

spaced numeric arguments.

The numeric arguments themselves are very easy to use:

pc stands for PRINTERCODE. Examples are given, for the different printers, and your attention is drawn to the Escape \* codes in the printer handbook. Default setting is 0. For example, Epson MX, and others, use 0 or 1 (where 1=Double density).

sc stands for SCALE. The range is 1 to 4. The value 3 is not strictly triple size, but rather a useful 1.5 × horizontal with a 2 × vertical scale.

Value 4, in conjunction with st, gives 3 × horizontal and 4 × vertical scale. Default setting is 2 × scale (H. & V.).

st stands for STYLE. 0 = upright or 1 = sideways print. You have to add 4 to these for four-colour shading, or 8 for eight-colour shading.

mg stands for MARGIN. This shifts the hardcopy print to the right where mg = normal character spaces.

bg stands for BACKGROUND. This sets the GCOL number of the background, normally 0 or 128. All other colours will print, and changing the bg will alter the allocation of shadings to colours.

WINDOW x x1 yb xr yt. These stand for the four sets of graphics co-ordinates, as in VDU24, enabling you to pick a specific part of the screen to be copied.

Default setting – all four zero (or omitted) treated as the whole screen.

There then follows a series of notes, among which is advice on halting the printing. Escape held down will not leave the printer hung-up as the Break key will do.

The combination of screen mode 0 and scale = 1 can cause loss of thin lines. Upright printing, in dual density, will cure this.

Styles 4 and 8 will not work with scales 1 and 2, presumably because the colour-shading dumps need a scale \* density high enough to give full resolution.

Window size should be limited for the Seikosha (<479 dots per line) and the NEC (<639 dots per line).

On the whole, I have already found this ROM to be dependable and very useful and on present performance and versatility, this Screen Dump has proven to be well worth the £15 quoted at present.

For those of you wishing to use the results of the ROM, all the screen dumps in this issue were done using it.

John Rivers

If I gave your son a BBC Micro for Christmas,

it was the best present you've ever had!

Because you could run your business for little more than the cost of his games!

STOCK CONTROL, INVOICING SALES & PURCHASE LEDGERS all at an incredible £30\*each-on disk\*-and we guarantee them to work.

DATA MANAGER-ondisk\*

Software For All's first-class range of Business Programs will do all your paperwork chores efficiently and cost-effectively—because they have been thoroughly tested before release so

Stock Control: Gives full control of your stock lines. Issues, Receipts, Adjustments, Stock Updates, Stock Valuation, Reorder Reports and full Stock Listings.

Sales Ledger: Full updating of clients' accounts. Aged Debtors' Analysis—aids credit control. Statements, VAT Summary, Ledger Cards, Daybooks, Invoices. Credit Notes. Receipts and Journals.

you can be sure they won't let you down. And at prices realistic enough to interest any businessman, however small. Briefly, here's what they'll do:

Invoicing: Integrates with stock—calls up items automatically. Rapid, simple to use, high-quality Invoice print. Many useful features including Credit Notes.

▶ Purchase Ledger: Full updating of suppliers' accounts. Creditors' Schedule, Remittance Advices, VAT Summary, Daybooks, Invoices, Credit Notes, Payments and Journals.



**BUSINESS PROGRAMS** 

Software For All Business Programs are widely available at reputable BBC and Acorn Dealers throughout the country. But if you have any difficulty obtaining them, please contact us direct and we'll be pleased to advise you.

\*£30 on disk, £20 on cassette. Prices exclusive of VAT.

# SOFTWARE FOR ALL

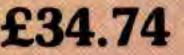
72 North Street, Romford RM1 1DA
Telephone 0708 60725 Dealer enquiries welcome.



# national Micro

# DATA STORAGE

A data cassette recorder that perfectly matches the BBC Micro.



Fully compatible with the BBC Micro and specifically designed for data saving and loading, the Pye data cassette recorder (with free power pack and BBC lead) is guaranteed to end your data storage and retrieval problems.

### The Hobbit

High speed floppy tape system £135.00

Zero memory option £25.00

(£18 if ordered with the Hobbit)

Our range of high quality drives below are all cased in metal to prevent interference and data loss.

# AMS 3" disc drives

<b>AMS-3(S)</b>	100k Single		£195.00
AMS-3(T)	200k Double	***************************************	£347.00

# Cumana slimline disc drives

Including integral power supply Cumana CS100 100k Single

The second second
£215.00
£340.00
£185.00
£235.00
£305.00
£285.00
£235.00
£338.00
£449.00

Replica II

This utility, enabling you to transfer your programs from tape to disc, is offered FREE with each disc drive purchased.

track, switchable) .....£579.00

Blank data cassettes (box of 10)	£4.35
Hobbit micro cassettes (box of 6)	£20.00
Double sided (100k x 2) 3" discs	
Single sided, single density BASF dis	
(box of 10)	
Double sided, double density BASF	
(box of 10)	

# DISC UTILITIES

Replica II	 £10.43*
The Key	 £11.26*

\* State 40 or 80 track

FREE Carriage on all our hardware (UK customers only).

Upgrade your BBC micro into a complete business machine.

# Torch Z80 Disc Pack

Gives a massive 800k of storage and a Z80 second processor enabling you to access a wide range of CP/M compatible software.

Order now and you'll be given more than £1,100 worth of free software: Perfect Writer (word processing), Perfect Speller (spelling checker), Perfect Calc (spreadsheet), Perfect Filer (database), Comanex business management game, and

NEW!

Z80 second processor for the BBC Micro + Sage 400 integrated accounts package.

the Torchnet networking system.

Three ledgers for the price of one - (Nominal, Sales and Purchase)

£375

£730

# **MONITORS**

Microvitec 1451 medium resolution	£325.00
Microvitec 1431 low resolution	
Microvitec 1431P colour monitor and	
composite video	
Kaga 12" amber screen high	
resolution	£119.00
Kaga 12" green screen high	
resolution	£109.00
Zenith green screen	
Normende 14" monitor and	
portable TV - Standard	£218.00
-Remote control	£230.00
0 0 1 1 1 1 1 1 1 1 1	

Specifically designed for use both as a monitor and a television (not just a modified TV), the Nordmende represents a perfect answer to the over-use of the domestic TV – at a price less than many comparable colour monitors.

The above prices are inclusive of connecting leads for the BBC Micro.

# **PRINTERS**

We stock a comprehensive range of printers from all leading suppliers. Please phone for details.

Personal shoppers can obtain the products advertised on these pages from the following retail stores:

Stockport Micro Centre 4/6 Brown St., Stockport, Greater Manchester. Tel: 061-480 0539

Wilmslow Micro Centre, 62 Grove Street, Wilmslow, Cheshire. Tel: 0625 530891

# SOFTWARE

We have over 1,000 titles in stock! Below is a selection, including our best sellers and new titles.

## Acomsoft

Sphinx Adventure	£8.65*
Philosophers Quest	£8.65*
Kingdom of Hamil	£8.65
Hopper	£8.65*
Starship Command	£8.65*
Graphs and Charts	£8.65
Creative Graphics	
Shirley Conran's Magic Garden	£8.65*
* Disc versions	
Alligata	
Dambusters	£6.91
Eagle Empire	£6.91
Contract Bridge	£8.65
A.S.K.	
Number Gulper	£8.65

# Cranky ...... £8.65

BBC Publications	
The Computer Program -1	/ol1£8.6
	Vol 2 £8.6
White Knight Mark Eleven	£10.0
Dr Who: the first adventure .	Company of the Compan
Vu Type (Typing Tutor)	
	The state of the s

World Wise ......£7.80

# 

B.E.S.

Wordwise	£36.0
Graphics	
Gremlin	
Disc Doctor	
Termi	

# Digital Fantasia Adventures

Computer Concents ROMs

Golden Baton	£8.6
Escape from Pulsar 7	
The Wizard Akyrz	The second secon
Perseus and Andromeda	Committee of the commit
Ten Little Indians	

# **Doctor Soft**

747 Flight Simu	lator	*********	£7.78
	* Disc version		£10.39
Gemini			
Detalement			C17 9E

## Database

Spreadsheet Analysis	
Graph Plot	
Home Accounts	
* Disc versions	£20.8

# Good Housekeeping

Mr I Tells the Time	XII.	.20
Mr T's Money Box	£11	26
Mr T's Alphabet Games	No. of Concession, Name of Street, or other Publisher, or other Publisher, Name of Street, or other Pu	100000
Mr T's Number Games		THE RESERVE AND ADDRESS OF THE PERSON NAMED IN
Mr T's Measuring Games	The second of the last of the	
Mr T's Shape Games		
The state of the s	Section 10	Contract of the

# Ivan Berg

Theatre Quiz	£11.00
Crime and Detection Quiz	£11.00
Science Fiction Quiz	
October 1000011 Care 111111111111111111111111111111111111	Contract of the last

# Lothlorien

Johney Reb	(1861)		£6.0
------------	--------	--	------

# centres

# MAIL ORDER DIVISION

Phone

Phone your order 061-429 8080

hours

Or use the order form below

Paras	
Melbourne House	
The Hobbitt	612.00
Merlin	
Merlin Scribe (Disc)	050 10
	£52.13
Microdeal	22.22
Space Shuttle	£6.95
Mirrorsoft	ar at
First Steps with the Mr Men	£7.78
Optima Software	
Datext	£8.65
Sea Wolf	£7.78
Pace	
Toolstar	
Commstar	£29.57
Program Power	I MANAGE.
Nemesis	
Bumble Bee	
Cybertron Mission	
And the second s	£0.91
Simon W Hessel	22.24
Great Britain Ltd	
Inheritance	
All three in presentation pack	
Superior Software	
Hunchback	66 91*
Centipede	
Fairground	
* Disc versions	



Postage and packing on all our software

# CHAMELEON

# This is a MUST for programmers take your pick from 4,096 colours!

Let Chameleon bring your programs to life with truly authentic colours. Mix and match the exact shades you require to give new depths of realism to your graphics. Choose from all the colours of the rainbow - and more! It's that simple... with this amazing hardware add-on for the BBC Micro. Phone for details.

RGB version ...... £77.40 TV version ......£86.08

# **JOYSTICKS**

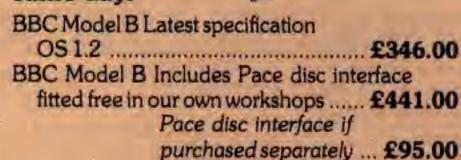
By-pass your keyboard and achieve more positive control.

Self Centring	£17.35
Non Self Centring	
Clares Joystick Utilities program	
Converts most non-joystick	
games for use withjoysticks	

RH Colour Light Pen	£39.96
Colour-Graphic Software	£8.65
Lightpen Utilities - 40 track disc	£5.00
-80 track disc	
Artfun	£8 65

# **MICROS**

No waiting! Phone in your order for the **BBC Micro** before 12 noon and we'll despatch same day!



Be one of the first to own the electrifying Electron!



The baby brother of the BBC Micro has been hailed by the computer press as a big breakthrough in power and price. This exceptional machine is already being forecast to be the top-selling micro of 1984. It comes complete with an introductory cassette of 15 programs, a very comprehensive user guide and an easy to understand DIY book on programming. £173.00

Stocks are limited, so it's very much a case of first come first served. We promise that no cheques will be cashed until the machine is despatched.

> **UK customers** Please add 15% VAT

# COMMS

#### Micronet

We invite you to join one of the world's largest databases.

To join Micronet you need:

- Prestel/Micronet subscription .. £13.00/qtr. This will be invoiced to you by Prestel; application forms included with each order.
- Hardware Modern 1000 ......£56.48 or Telemod II (includes automatic transmit/receive switching) ......£73.87 Software Cassette based ......£13.00 or ROM based ...... £17.35

# **Acorn Teletext Receiver**

Enables you to download programs and access the Ceefax database ..... £195.65



All equipment listed here is available for rental on a daily. weekly or monthly basis. Ask for details.

# ORDER FORM

Post to: NATIONAL MICRO CENTRES. 36 St. Petersgate, Stockport SK1 1HL

Please supply the following:				Total	
- reasesapply trie joilouni	3	Qty	£	р	
	A STATE OF THE PARTY OF THE PAR				
	Comment of the Commen	*****			
	And the second s			******	
* * * * * * * * * * * * * * * * * * * *			******		
* * * * * * * * * * * * * * * * * * * *			-		
	L	T 150			
Attractive credit terms			FRE	F	
Phone for details			· · · · · · · · · · · · ·	L	
		TOTAL_			
indicate method of payment:	Name				
The state of the s					
National Micro Centres					
Access/Ravelacioned No.		.,,,,,,,			
Access/ Barciaycard INO.	Tel No.				
	200000000000000000000000000000000000000				
	Attractive credit terms Phone for details  indicate method of payment: Cheque payable to	Attractive credit terms Phone for details  Indicate method of payment: Cheque payable to National Micro Centres Access/Barclaycard No.  Tel. No.	Attractive credit terms Phone for details  TOTAL  indicate method of payment: Cheque payable to National Micro Centres Access/Barclaycard No.  Tel. No.	Attractive credit terms Phone for details  Indicate method of payment: Cheque payable to National Micro Centres Access/Barclaycard No.  Attractive credit terms Camiage FRE TOTAL  Name Address  Address  Tel. No.	

# Make the most of your micro

# DATA FILE

The all-singing, all-dancing Data File, built on five years experience yet purposely created specifically for the BBC Micro.

Experience has taught us that not only do any two people never need the same in a data file, but even one person wants it to be capable of many things. We think that the Kansas Data File fulfills this need, and will be recognised as the standard.

It's main appeal must be its sheer versatility. You can define not only the length of any field, but the actual number of fields—up to 20! So you can make it an ordinary name and address file, or anything extraordinary that you might wish. And all permanently saved to tape...

The number of files available depends entirely on the length of the file. Up to 1947 with a single field.

Here are the facilities of Data File:

Create File Define any number of fields up to 20. Define length of each field up to 255 characters. Name each field as required. Computer automatically uses maximum memory.

Insert Simply type in pressing Return for next field. Search Data File has a most unique Search facility, for it will search any defined field throughout the whole file, but not only this, it can be asked to search for the item at the start of the field or in fact anywhere in that field, making it a very powerful facility indeed.

Edit Couldn't be simpler-just use the cursor keys. Jump A very handy feature, allowing you to jump to any particular file you require.

Sort Not just the normal first field sort, but one which allows you to define the sort field.

Status Not found in normal data files, this is useful for it tells you the file name, when updated, files used, and most important how many files free.

Print A most important facility, allows the printing of the files, as required.

Delete Delates unwanted files, and at the same time the remaining records will be closed up.

Save Allows you to save the entire file to cassette. This can be loaded at the start when Data File is run.

To facilitate the ease of operation, all the above functions are on the red function keys, so needing just a single key stroke to bring into operation.

£12.50 Vat and post paid

knowing the needs

of micro users has

resulted in these two

programs for the

# PERSONAL ACCOUNTS

Another exclusive Kansas program, designed for the micro user to keep an accurate check on all accounts.

This program is not limited to personal cash accounts, but can also be used in conjuction with a cheque account or even to keeping a credit card account in order. In fact there is little limit to its use, where the transaction of money is concerned.

As it creates its own files to tape, it can be used for a multitude of purposes, each having its own file and thus being loaded to handle transactions.

It can hold 500 transaction entries!

A great asset of the program is that it can be customised by altering any of the 32 items, with in fact 10 already set aside for this purpose, with the others too being simple to change.

Each entry has its own number, together with amount, date and item, with all details and current balance shown after each entry. This makes it very straightforward to add either payments or deposits to the file.

There is also a list facility, even allowing the scrolling through the entire file.

Facility is also provided for alteration of any entry, with automatic update of the current balance. The balance itself can be altered, which is useful when using as a credit card account, as a monthly payment is made.

There is a clever little routine which allows you to estimate the effect any particular payment may have on your account, so you can see if you can really afford it or not!

A status section lets you see the current balance, file name, when updated, transactions on file and spare entries.

Personal Accounts is very friendly in use, with messages should you do something wrong, such as using the same transaction number twice.

Files can be saved to cassette, and you have the choice of either loading in a saved file or creating a new one, when the program is run.

Use is made of colour, with the obvious showing of deposits or payments.

£12.50 Vat and post paid

When you buy from Kansas you are buying from the longest established software publishers in the country

The only company that can give a lifetime guarantee and assured same-day first class post service

APPROACHABLE-We attend all the major computer exhibitions





Recognised Brand Leader in microcomputer software

Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield, S44 5XF. Tel. 0246 850357

Meilable 700

Z80 second processor for BBC Microcomputer with SAGE 400 integrated accounts program £375

+ VAT







GCC (Cambridge) Limited 66 High Street, Sawston, Cambridge CB2 4BG Telephone: Cambridge (0223) 835330

Trade and local authority enquiries welcome.

Prices correct at time of going to press.

# KAY-ESS

# COMPUTER

# PROFESSIONAL PROGRAMS FOR THE MODEL B

## SPACE TRAFFIC CONTROLLER-"NEW"

£6.95

As a space traffic controller you have been stationed at the main robot cargo port of the planet Ore-7. It is your job to get the robot spacecrafts down in one piece. As your confidence increases you can increase the number of crafts allowed within your control area. Warning: not to be played after a hard or hectic day!

SPACETANK £6.95

After you SPACE TANK has landed on the planet Orion, a series of alien tanks, surface hoppers, and spacecrafts will attack. How long can you hold out commander? This game makes use of the Beeb's fast scrolling ability. Can be used with either keyboard or joysticks. Top ten table. Pause option.

STAR HAWKS £6.95

Can you stop the STAR HAWKS before they stop you? Slow work means the generation of more laser firing mutant hawks. Based on the games of Galaxian and Gorf. Can be used with either keyboard or joysticks. Top eight table. Pause option.

HORSES £6.95

Come on now, don't be shy, choose one of the six horses and let's see what you can do. How many of the fences can you complete at the Orion arena, especially with the clock ticking away? New riders can try one of the more docile horses while others may like to risk one of the more lively beasts! Can be used with either keyboard or joysticks. Top ten table. Pause option.

DESIGN £5.

If you like watching your user defined characters run around the screen but are fed up with the time consuming mathematics, then DESIGN is for you! With DESIGN you can draw your characters on an 8x8 grid and let the machine do all the work. DESIGN's features include being able to recall characters for re-editing, displaying VDU 23 commands, and amendable cursor. All characters used in KAY-ESS programs are created using DESIGN.

KAY-ESS programs are now becoming available at local dealers. Due to demand, we are currently re-writing KAY-ESS programs for use on the ELECTRON. Dealer enquiries welcome.

KAY-ESS computer products previously traded under the name of ORION SOFTWARE.

Let words become fun again with our three language, (ENGLISH, FRENCH, ITALIAN), version of the popular game of HANGMAN. There are 3 levels of play for each language. All words can be replaced or removed, and new ones can be added. HANGMAN comes with an instruction program giving full details for parents and teachers. Once running prying eyes cannot access the word lists!

## \* CURRENT BEST SELLERS \*

EARLY YEARS 1 and 2 £7.95 EACH or £14.00 FOR BOTH

These two packages are designed to help a young child with some of the simple concepts that they will need in the world. The emphasis is on learning through fun with simple game type tasks to enforce idea's. 'Time tables' are out and Fred the Frog is in! Topics covered include subtraction, addition, recognition, colour, shapes, sizes, sounds/notes, co-ordination, distances, estimates, directions.

EARLY YEARS 1

- A) MICKEY THE MONKEY and his apple tree make subtraction fun.
- B) COLOUR BLOCKS bring sizes and colours into perspective.
   C) MERRY MUSIC turns the keyboard into a musical keyboard.
- D) FUNNY FACES presents a line up, which one is the suspect?
- E) FRED THE FROG needs co-ordinated help to get across the pond.

## EARLY YEARS 2

- A) THE POND seems very active today.
- B) SPEED is required to keep the cake on the conveyor beit.
- C) DIRECTIONS seem to be needed by everyone in Orion village.
   D) ORDER the blocks.
- E) SID THE SPIDER needs some help to get out of the maze.

For children between 4-8 years of age.

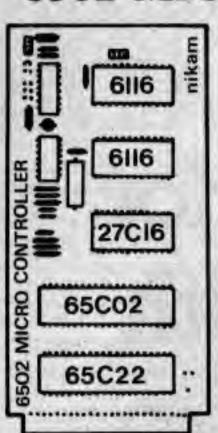
Cheques/P.O.'s should be made payable to KAY-ESS computer products. All prices are fully inclusive. MAIL ORDER ONLY.

KAY-ESS Computer Products, 11 Buttercup Close, Romleighs Park, Harold Wood, Essex RM3 0XF.

our 3 level version of NOUGHTS AND CROSSES!!!

FREE with all orders is

# 6502 MICROCONTROLLER



- Interfaces to BBC computer with software UART
- \* 65C02 CMOS microprocessor
- \* Low power consumption can be battery powered
- \* 3 × 2K byte-wide memory sockets
- \* 1MHz ceramic resonator clock
- \* 6522 VIA 2 x 8 bit I/O ports, 2 timers, shift register, 4 control lines
- \* Autostart feature

Assembled and tested (inc. manual) £69.99 Bare board (P.T.H.) £16.99

TECHNICAL MANUAL Complete documentation - £2.50 (inc. postage, no VAT)

## MONITOR EPROM £14.99

Commands: - Memory - Load, Fast Load. Programme - Run, Step (display registers).

Programmes assembled on the BBC are downloaded via the RS423 port.

# MOTHER BOARD £18.99 Bare board £4.99

Contains edge connector, reset switch, -5V converter, RS423 level converter, power lead, signal lead and plug.

## BBC VIA BOARD £24.99

Adds an extra 6522 VAI (inc. 34 way cable) N.B. This item is not required for use with the above.

#### Mail order only P & P £1.50

Cheques, postal orders payable to:- Nikam Electronics Ltd., 25 Suffolk Drive, Lacey Green, Wilmslow, Cheshire SK9 4DE

Prices include VAT. Please allow 28 days delivery.



# D.A. COMPUTERS LTD.

# **BBC ACORN COMPUTERS IN LEICESTER**

Specialists in hardware and software. Fully authorised ACORN-BBC Dealer.

Complete after sales service - repairs and maintenance contracts.

Two of the most useful utilities for the serious BBC User.

SCREEN DUMP ROM

This 8K page ROM will print out any graphics screen (except mode 7) upright or sidewise, ×1, ×2 or ×4

scale on a variety of matrix printers including Epson, Shinwa, Star, NEC, Seikosha, KDC, etc. It will also substitute up to eight shades of grey to represent screen colours. Mode 7 text and graphics can be printed on the FX80 or FX100 only (e.g. telextext screens). This Machine Code software will give you the fastest print out possible on your printer. Page ROM software means you have all the RAM available for your own programmes. Full documentation provided. £20.00

#### MACHINE CODE MONITOR ROM

Provides powerful facilities for monitoring and debugging machine code and

BASIC programmes. Includes single step, break points, disassembler, memory scan "window", search for string or byte sequence, memory move, etc. Also provides BASIC program search and list variables. Extensive documentation, £20.00

BBC Model A and B Microcomputers always in stock

#### PRINTERS

EPSON FX80 Printers at	£399.00
EPSON RX80F/T Printers at	£299.00
SHINWA CP80 Printers at	£279.00
KDC LOGITEC Printers at	£299.00
Many other printers in stock	

MONITORS	
MICROVITEC 14" COLOUR - ST. RES. at	£241.50
MICROVITEC 14" COLOUR - MED. RES. at	£373.75
MICROVITEC 14" COLOUR-HIGH RES. at	£503.70
TECO 12" GREEN SCREEN (18MHz Bandwidth)	£107.00

Novex and Cabel also in stock Also a wide range of Books, Software and accessories for the BBC micro.

Pharmacists — call for a demonstration of our high speed label printing system — 2,500 drug names in R.O.M.

All our prices include V.A.T. - but add £5.00 carriage for heavy items (Printers, Monitors etc.) Please call and visit our showroom at:-

# D.A. Computers Ltd, 104, London Rd., Leicester.

(5 minutes walk from railway station).

We close all day Monday and Sunday otherwise open 9am to 5pm.

Tel. (0533) 549407



- Sits inside the BBC or plugs into an extension rack
- Enables standard Flex format Discs to run on BBC
- Supports High Level Language Compilers
- Cross Assemblers and Disassemblers for most micros
- Connects directly on to the tube
- 64k DRAM on board
- Two 28 pin byte wide memory sockets
- Acorn Bus compatible DIN 41612 Bus interface
- Also available as a single board controller

For full information contact Phil Taylor at:



11 St Margarets Road Girton, Cambridge CB3 0LT (0223) 276791

Cambridge Microprocessor Systems Limited



pixel resolution. The pen itself was described in the

October 1983 issue of The Micro User and a painting program was given the following month. This simulated the action of a paint brush and produced broad and flowing strokes.

Some artistic endeavours however, are more suited to a clean-cut graphical presentation and so the Draughtsman program has been produced.

The basic light pen is only capable of character resolution - that is, the computer can only sense the position of the pen to the nearest printing character. So in order to achieve pixel resolution we have to resort to some software trickery.

Those of you who have used the painting program will have noticed a small offset between the pen's position and the paint on the screen.

This is naturally compensated for by the brain, and leads to no difficulty in use. However, to coax pixel resolution out of the pen we can use this ability of the brain to good effect.

Consider Figure I. This shows one character position being pointed at by a light pen. If the pixel point we are interested in is in this square then it is not changed.

However if it is in one of the adjacent squares (shown shaded) it is moved one pixel position towards the pen.

If the point of interest is outside the

immediate area it is moved much more rapidly towards the pen. In practice this means that the point is teased into the correct position, and due to the

# By MIKE COOK

cleverness of the human brain is quite naturally achieved.

As we now have a basic method of defining a pixel's position we are able to build the software around this.

Obviously a freehand sketch using the pen would be difficult to control. But as a draughtsman is concerned with

straight lines we can use rubber banding techniques to position our line exactly.

When it is in position the press of a key will fix it permanently on the screen.

As well as rubber-banding single lines, we can also use triangles and rectangles and there is a routine for coping with circles.

When running the program the screen will go white to allow the pen to

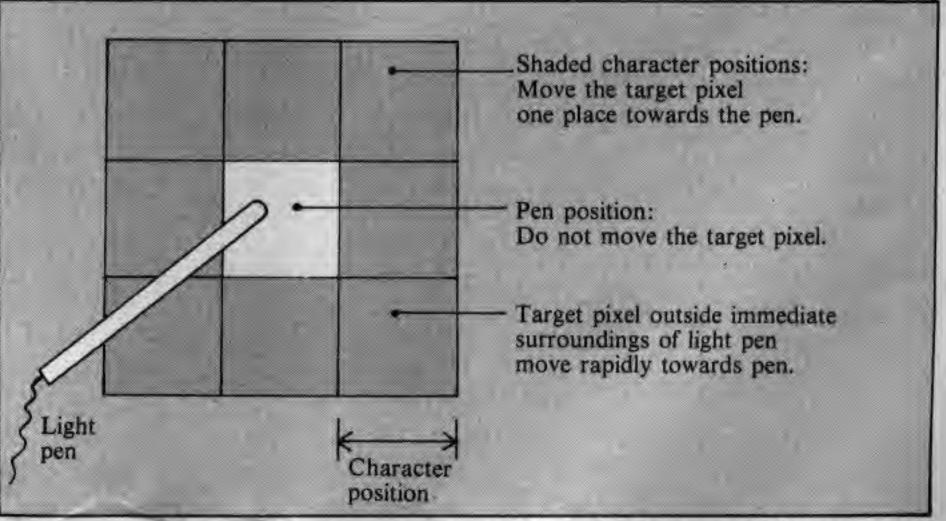


Figure I: Movement of the target pixel

# From Page 141

pick up light. Nothing will happen until one of the modes is entered.

To do this type the letter for the appropriate mode. For example let's draw a straight line by pressing the L key.

The top line of the display should now say LINE. Take up the light pen and you should see a single lit pixel following the pen.

When it is in the correct position for the start of the line press any key. When the pen is moved a line will be drawn from this point to the pen.

This line will move following the pen and behaving like a rubber band on the screen.

When the end position of the line is at the correct place press the Return key and you will be back in the command mode, ready to draw another shape.

If you want to carry on drawing lines press the space bar instead of the Return key and you will stay in the line mode.

If you want the start of the new line to be the same point as the end of the old line then instead of the space bar press J for join.

The triangle mode works in a similar

manner with first a line being rubber-banded and then the full triangle. In this mode the J key will join up the new triangle to the last side of the old one.

When drawing a rectangle the first point will fix one corner and the second point will fix the opposite corner. The join key will join the next rectangle to the last corner of the previous one.

When selecting the polygon mode you will be asked how many sides the polygon is to have. If you require a circle then a large number like 40 should be used.

In this mode the radius is defined by rubber banding but this radius line disappears when the polygon is drawn.

If the join option is used the new polygon will be drawn with the same centre point as the last one.

You can also change the colour of the lines by pressing the C key. This will cycle through the three colours available in Mode 1.

These are set up in line 90 and can be changed to suit your own preferences.

When you have finished your masterpiece the screen can be saved as a file by typing S. You will be asked to provide a file name and the memory

locations that make up the screen will be saved.

For those of you with discs this file will be placed in the directory S for screen dump.

This will reduce the confusion between a screen dump file and a program. If you have tape then the characters S. will be added to the beginning of the file name.

The program also allows you to load a previously dumped file back to the screen to be worked on further. This is done by typing L.

Hints on typing in the program:

Line 80 defines a text window of one line at the top of the screen. This line is best left out until all the typing errors are corrected as any error messages will scroll off the top before you can read them.

There are some variables that start with the LETTER O such as OX% (Old X). Do not confuse these with the number 0.

In line 300 the space between the quote marks and the number is vital. You will get an error message if it is left out.

Unfortunately the error message is not all that helpful. In various lines (such as 150) note there is no space between the quote marks.

# Draughtsman listing

5 REM LIGHT PEN DRAUGHTSMAN Mike Cook

10 MX=1
:CX=3

20 MODE MX

30 PROC\_LINT

40 TRIANGLE=FALSE

50 BLUE\_IN\_THE\_FACE=FALSE

60 CLS

70 PROC\_INSTRUCTIONS 80 VDU 28,0,0,39,0

90 VDU 19,0,7,0,0,0,19,7,4,0,0

,0,19,2,2,0,0,0 100 GCOL 3,C%

110 REPEAT

120 XX=-1 :YX=-1

130 REPEAT

140 AS=INKEY\$ (0)

150 UNTIL A\$()""

160 IF A\$="W" THEN CL6

170 IF A\$="S"

THEN PROC\_FILE

180 IF A\$="G"
THEN PROC\_GET

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

190 IF A\$="P"

THEN PROC\_POLY

200 IF A\$="R"

THEN PROC\_REC 210 IF A\$="C"

THEN PROC\_COLCHANGE

220 IF A\$="L"

THEN PRINT "LINE"; : PROC\_LINE

230 IF A\$="T"

THEN PROC\_TRIANGLE

240 IF A\$()"E"

THEN PRINT

250 UNTIL BLUE IN THE FACE

260 DEF PROC\_FILE

270 PRINT

280 INPUT "FILE NAME FOR SAVED SCREEN ",F\$

290 IF LEN (F\$) < 1 THEN ENDPROC

300 \$CLI%="SAVE P. "+F\$+" 3000 8000"

310 XX= CL1% MOD 256 :YX=CL1% DIV 256

320 CALL &FFF7

330 XX=-1 : YX=-1

340 ENDPROC

350 DEF PROC GET

360 PRINT

370 INPUT "FILE NAME OF SCREEN"

380 IF LEN (F\$) ( 1 THEN ENDPROC

390 \$CLIX="LOAD P."+F\$

400 XX= CLIX MOD 256 :YX=CLIX DIV 256

410 CALL &FFF7

420 XX=-1

: Y%=-1

430 ENDPROC

440 DEF PROC\_COLCHANGE

# The BBC Micro can now give your children a private education.

The BBC Microcomputer now accounts for 80% of the computers being ordered under the current D.O.I. Primary School Scheme.

It's also the computer which a rapidly increasing

number of people are choosing for their homes.

One of the reasons for its success is that it makes learning highly entertaining for everybody. From children who are getting to grips with the alphabet, to adults who want a gentle but intensive introduction to the complex world of computing.

Now, there's a substantial new catalogue of educational

programs specially for the BBC Microcomputer.

It has been developed by Acornsoft, the software division of Acorn Computers who manufacture the BBC Micro.

# Making faces without getting scolded.

With the new Facemaker program, your children can make

over a million faces. It's like an identi-kit, allowing them to depict anyone they want. They start by choosing the eyes. Then they can choose the mouth, the ears, the nose, the facial outline and the hairstyle.

And if they really fancy dressing up, they can add

earrings and hats.

In doing all this, they learn to read and spell, as well as developing their powers of description.

The money program, two games for the price of one.

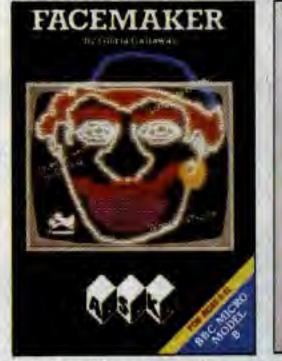
Mr. T. is an engaging little figment of the microchip who can teach your children all the complexities of our coinage system.

His Money Box program has two games, each of which

can be played at different levels.

In Money Match, the challenge is to collect a set of coins, matching them according to shape, size and value.

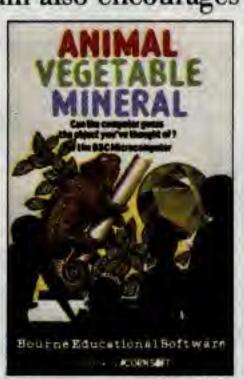
In Money Box, you can give your child and Mr. T. a helping hand to get all the coins on the screen into the box. (It's always different, because the coins on the screen are based on the small change you have to hand.)





what it is.

keep giving it hints.



A chance to teach the Micro a thing or two.

children can get the computer guessing.

or whether oil is vegetable or mineral.

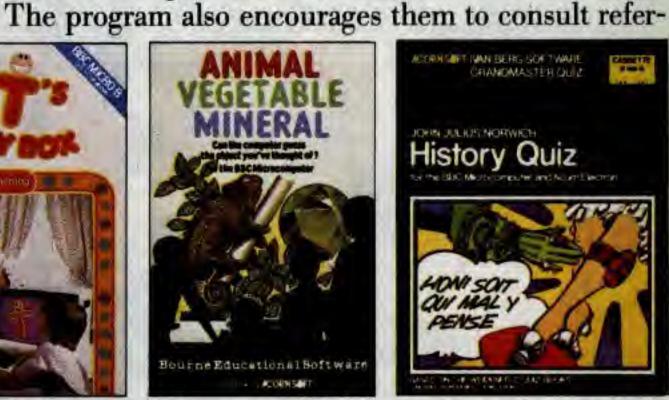
With the Animal, Vegetable, Mineral program, the

They think of an object. The BBC Micro has to decide

If it doesn't come up with the answer, the children can

In doing so, they are encouraged to question the

difference between such things as crocodiles and alligators,



ence books so that they can ask the computer increasingly tough questions.

Questions on Julius Caesar from J. Julius Norwich. John Julius Norwich's History Quiz is one of the new BBC Micro Grandmaster quiz series which also covers theatre, crime and detection, music, science fiction and royalty.

On the history front, there are 300 brain-testing questions, covering all aspects of British history from Julius

Caesar to Margaret Thatcher.

And to increase the educational value, Mr. Norwich has posed the questions from angles which will give a broader understanding of events.

For the full catalogue, clip the coupon.

There are thirty more new BBC Micro programs in Acornsoft's new catalogue.

For a free copy, complete the coupon, or telephone 0933-79300. Or ask your local BBC Micro dealer.

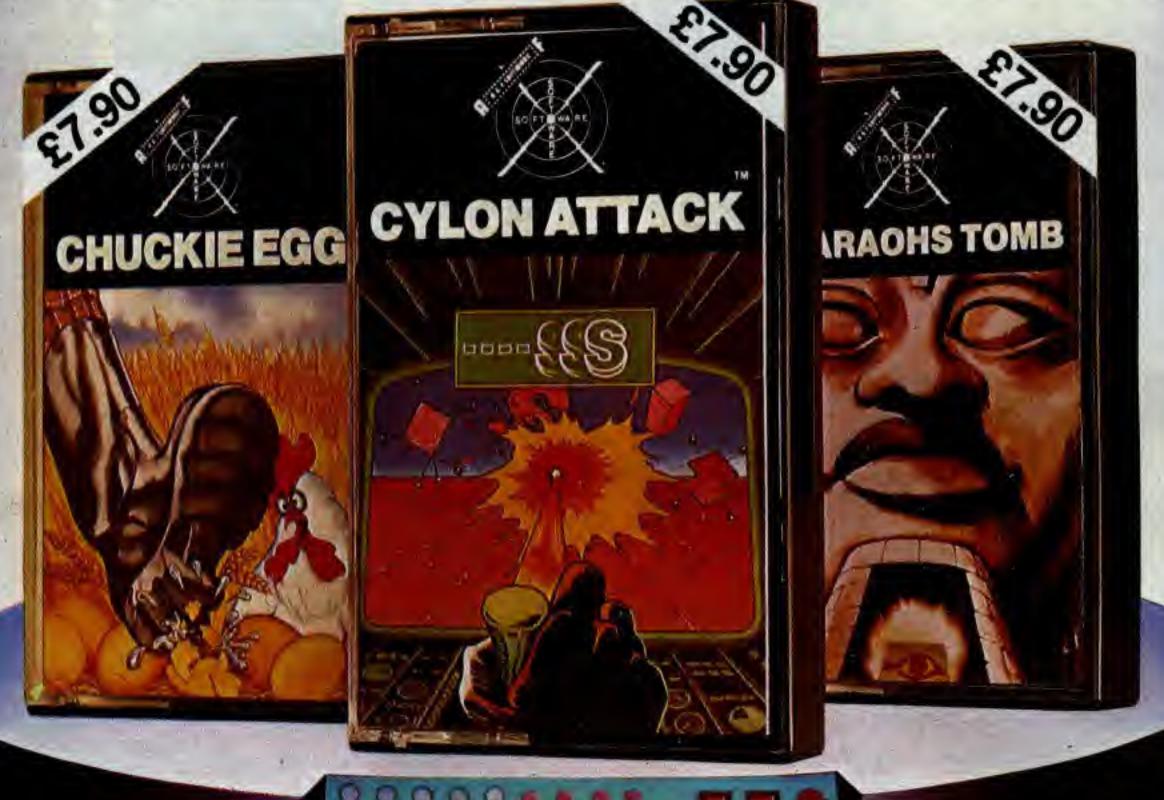
If you're not yet a BBC Micro owner, you can get full details of the computer at the same time.



To Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Please send me the new Acornsoft catalogue "At Home With The BBC Microcomputer." I would also like details of the BBC Micro [ (tick) Name. Address. Postcode. Selected home education programs distributed by







	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE	1	/	1	/
CYLON	/	/		
JUNGLE FEVER				1
PHARAOHS TOMB	~	-		1/2



Available from W.H. Smiths, 
John Menzies and all leading 
computer stores.

F Software Unit 8, Canalside Industrial Estate, Woodbine Street East, Rochdale, Lancs. OL16 5LB. Tel: 0706 341111

# Draughtsman listing

From Page 142	930 PROC_FOLLOW	1450 PRINT NZ;" SIDED POLYGON";
JEO CY-/CYLLL AND T	940 PROC_TRIBAND(OX%,OY%)	1460 REPEAT
450 C%=(C%+1) AND 3 460 IF C%=0	950 OXX=XX	1470 PROC_BAND1
THEN CX=CX+1	:07%=7%	1480 REPEAT
470 COLOUR CZ	960 PROC_TRIBAND(XX,YX)	1490 PROC BAND2
:SCOL 3,CX	970 A\$=INKEY\$ (0)	1500 PROC_DPOLY(XX,YX,DXX,OYX,NX)
480 PRINT "NEW COLOUR ";	980 UNTIL A\$<>""	1510 IF A\$="J"
490 ENDPROC	990 PROC_TRIBAND(XX, YX)	THEN MOVE OXX, OYX
500 DEF PROC_BAND1	1000 GCOL 0,C%	:PLOT 13, XX, YX
510 REPEAT	1010 PROC_TRIBAND(XX,YX)	1520 UNTIL A\$(>"J"
	1020 GCOL 3,C%	1530 UNTIL A\$=CHR\$ (13)
520 PROC_FOLLOW	1030 IF A\$<>CHR\$ (13)	1540 ENDPROC
530 A\$=INKEY\$ (0)	THEN PLOT 69, XX, YX	1550 DEF PROC_DPOLY(X,Y,XT%,YT%,N%)
540 UNTIL A\$()""	1040 T1XX=T2XX	1560 LOCAL C1,S1,P,R,A%,X1,Y1
550 OXX=XX	: T1Y%=T2Y%	1570 GCOL 0,C%
: 0Y%=Y%	1050 UNTIL A\$<>"J"	1580 P=2*PI /N%
540 XT%=X%	1060 UNTIL A\$=CHR\$ (13)	1590 NX=NX+1
:YTX=YX	1070 ENDPROC	1600 C1=COS (P)
570 ENDPROC	1080 DEF PROC_TRIBAND(XX,YX)	1610 S1=SIN (P)
580 DEF PROC_BAND2	1090 MOVE TIXX, TIYX	1620 MOVE X,Y
590 REPEAT	1100 PLOT 13, XX, YX	1630 FOR AX=1 TO NX-1
600 PROC_FOLLOW	1110 MOVE T2X%, T2Y%	1640 X1=XT%+(X-XT%) *C1-(Y-YT%) *S1
610 MOVE OXX, DYX	1120 PLOT 13, XX, YX	1650 Y1=YTZ+(X-XTZ)*S1+(Y-YTZ)*C1
620 PLOT 13, XT%, YT%	1130 ENDPROC	1660 X=X1
630 MOVE OXX,OYX	1140 DEF PROC_REC	:Y=Y1
640 PLOT 13, XX, YX	1150 PRINT "RECTANGLE";	1670 DRAW X,Y
650 XTX=XX	1160 REPEAT	1680 NEXT
:YTX=YX	1170 PROC_BAND1	1690 GCOL 3,C%
660 A\$=INKEY\$ (0)	1180 REPEAT	1700 PLOT 69, XX, YX
670 UNTIL A\$<>""	1190 PROC_RECBAND	1710 ENDPROC
680 MOVE 0X%, 0Y%	1200 REPEAT	1720 DEF PROC_FOLLOW
690 PLOT 13,XX,YX	1210 PROC_FOLLOW	1730 PROC_LPGINT
700 ENDPROC	1220 PROC_RECBAND	1740 XT=PXPOS#32
710 DEF PROC_LINE	1230 OXX=XX	1750 YT=(32-PYPOS) +32
720 REPEAT	:07%=7%	1760 PLOT 69, XX, Y%
730 IF A\$(>"J"	1240 PROC_RECBAND	1770 IF ABS (XT-X%) >96
THEN PROC_BAND1	1250 A\$=INKEY\$ (0)	THEN XX=XX+((XT-XX)/2)
740 PROC_BAND2	1260 UNTIL A\$<>""	ELSE IF ABS (XT-XX) > 32
750 GCOL O,CX	1270 PROC_RECBAND	THEN XX=XX+4+SGN (XT-XX)
760 MOVE DXX, DYX	1280 GCDL 0,C%	1780 IF ABS (YT-YZ) >96
770 DRAW XX, YX	1290 PROC_RECBAND	THEN YX=YX+((YT-YX)/2)
780 GCOL 3,C%	1300 GCDL 3,C%	ELSE IF ABS (YT-Y%) >32
790 T1X%=0X%	1310 IF A\$(> CHR\$ (13)	THEN YX=YX+4+SGN (YT-YX)
: T1Y%=0Y%	THEN PLOT 69, XX, YX	1790 PLOT 69, X%, Y%
800 0XX=XX	1320 XTX=XX	1800 ENDPROC
:0Y%=Y%	: YT%=YX	1810 DEF PROC_LINT
810 UNTIL AS=CHR\$ (13) OR TRIANGLE=TRUE	1330 UNTIL A\$(>"J"	1820 DIM TLAG(7), LPC(7), GRAB% 20
820 ENDPROC	1340 UNTIL A\$=CHR\$ (13)	CLIX 27
830 DEF PROC_TRIANGLE	1350 ENDPROC	1830 P%=GRAB%
B40 PRINT "TRIANGLE";	1360 DEF PROC_RECBAND	1840 E
B50 REPEAT	1370 MOVE XTX, YTX	1850 LDX #16
860 TRIANGLE=TRUE	1380 PLOT 13, XTX, 0Y%	1860 LDA #17
870 PROC_LINE	1390 PLOT 13,0XX,0YX	1870 STX &FE00
880 TRIANGLE=FALSE	1400 PLOT 13,0X%,YT%	:LDX &FE01
890 REPEAT	1410 PLOT 13, XT%, YT%	1880 STA &FE00
900 T2XX=XX	1420 ENDPROC	:LDA &FE01
: T2Y%=Y%	1430 DEF PROC_POLY	1890 RTS
910 PROC_TRIBAND(XX,YX)	1440 INPUT "POLYGON NUMBER OF SIDES"	1900 1
920 REPEAT	.NX	

# Draughtsman listing

# From Page 145

2080 LPR=80

2090 IF M%>3

1910 RESTORE 1950 1920 FOR A=0 TO 7 1930 READ TLAG(A), LPC(A) 1940 NEXT 1950 DATA 1542,1,1542,2,1543,4,2053 1960 DATA 2820,1,2820,2,3076,1,10248 1970 ENDPROC 1980 DEF PROC\_LPOINT 1990 REPEAT 2000 AX=ADVAL (1) DIV 64 2010 UNTIL A%>100 2020 PROC LPOS 2030 ENDPROC 2040 DEF PROC LPOS 2050 \*FX19 2060 PVAL=(USR (GRABX) AND &FFFF)-TLAG (M%) 2070 IF PVALCO THEN PVAL=0

THEN LPR=40 2100 PYPOS=PVAL DIV LPR

2110 PXPDS=INT ((PVAL MOD LPR)/LPC(MX))

2120 ENDPROC

2130 DEF PROC\_INSTRUCTIONS

2140 PRINT

2150 PRINT SPC (9); "LIGHT PEN DRAUGHTS MAN"

2160 PRINT SPC (13); "By Mike Cook"

2170 PRINT

2180 PRINT "First select a mode by typing a letter:-"

2190 PRINT

2200 PRINT "L - Draw a LINE"

2210 PRINT "T - Draw a TRIANGLE"

2220 PRINT "R - Draw a RECTANGLE"

2230 PRINT "P - Draw a POLYGON or

CIRCLE"

2240 PRINT

2250 PRINT "Then move the dot with the light pen."

2260 PRINT

2270 PRINT "Press RETURN at the end

of each stage"

2280 PRINT "or to stay in the mode

press SPACE."

2290 PRINT "Alternatively pressing

J as the last key";

2300 PRINT "will Join up the next shape."

2310 PRINT

2320 PRINT

2330 PRINT "Other commands are:-"

2340 PRINT

2350 PRINT "C - To change the COLOUR"

2360 PRINT "W - To Wipe the screen

clean"

2370 PRINT "S - To SAVE the screen

as a file"

2380 PRINT "G - To GET a screen previo usly saved"

2390 PRINT

2400 PRINT "Press any key to begin."

2410 A\$=GET\$

2420 CLS

2430 ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 169.

Geography teacher Bob Phillips' program on the school's BBC Micro needed a map of Australia divided into states, with the names of states and cities appearing when requested by the student. Using an RD Digital TRACER, Bob prepared this usually laborious task in just six minutes. "It's so simple," he said "... it's traced directly from an atlas, scaled up or down as needed, and so I have a very accurate presentation, with plenty of colour and

movement to maintain HRTH AUSTRALIA the kids' interest." QUEENSLAND

The RD Digital TRACER is specially suited for educational use. From geography to biology, from chemistry to arts and crafts. It's features include:-

 Immediate reproduction from original drawings (up to A3) to display file

Adding geometrical shapes, text, colour and shading

Automatic re-trace, or animation (on BBC)

Save your drawings on cassette or print-out, or merge with your own programs

Uses all the BBC's colour graphics modes, including Teletext

No previous computer knowledge needed.

Available direct, from Spectrum stores or Griffin & George

Tracer(s) for BBC Micro at £69.95 each, total Please send Tracer(s) for ZX Spectrum at £55.50 each, total £

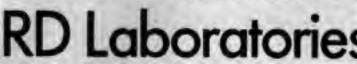
Name

Address

Cheque, payable to RD Laboratories Ltd, for £

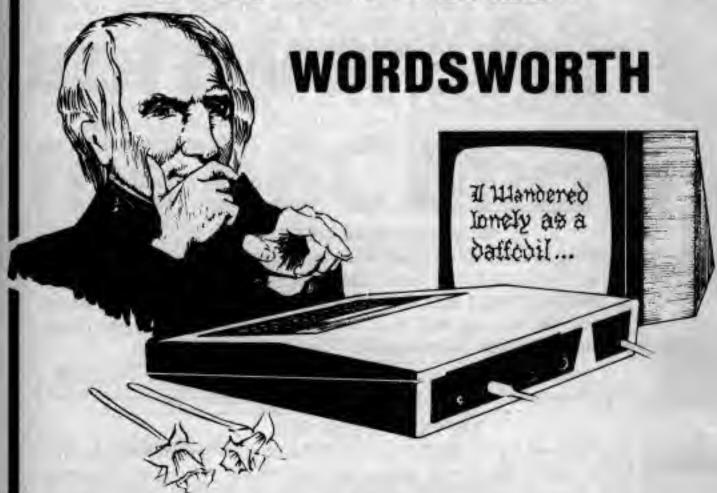
Send to: Dept MU2 RD Laboratories Ltd 20 Court Road Estate Cwmbran Gwent NP44 3AS. Allow 28 days for delivery.

For further details write (SAE please) or phone





WHICH BBC WORD-PROCESSOR
DOES MAIL-MERGING, GIVES YOU
AS MANY COPIES AS YOU WANT,
PRINTS 50-PAGE DOCUMENTS,
DOES WORD-COUNTING AND EVEN
ADDS UP FIGURES?



# WORDSWORTH

does all these things as well as the usual jobs.

No need to buy separate mail-list programs or printer drivers, no need to pay three times the price for word-processors with fewer features! Compatible with Acorn or Watford DFS, Microwriter Keyboard and almost any printer.

'I have been responsible for the selection of several generations of applications software. I can recognise a well-written package and am very impressed with the performance and "user friendliness" of Wordsworth.'

— P.J. STANLEY

'I find it very useful, not only for its features, but also for the helpful prompts, which enable a beginner like me to keep on track.'

— R. BLEWETT

# And now.... PROPORTIONAL PRINTING

WITH STRAIGHT MARGINS, USING WORDSWORTH WITH UTILITY 1 AND AN EPSON FX-80 PRINTER. PROPORTIONAL PRINTING WITH THE JUKI DAISYWHEEL READY SOON.

Available from selected branches of W.H. Smith and good retailers, or from

# IAN COPESTAKE, Dept. W17

23, Connaught crescent, Brookwood, WOKING, Surrey GU24 0AN. Telephone/Mailbox: 048674755

# PRICES including MANUALS, VAT, P & P

WORDSWORTH DISC	40-TRACK	80-TRACE
including rigid A5 wallet	£22.71	£23.86
UTILITY 1 DISC		
without wallet	£8.62	£9.78
with wallet	£11.78	£12.94

\* £2.00 OFF IF YOU BUY BOTH AT ONCE \*

WORDSWORTH TAPE £17.54 MANUAL ONLY £2.88
DISC WALLET £3.16 PACK OF 10 SSSDDISCS £19.55

'SEE 10' DISC LIBRARY BOX £3.16

(the best design we have seen)

PROGRAMS AVAILABLE SOON ON 3-INCH DISC

EUROPE:- Prices as above

OUTSIDE EUROPE:- Please add £3.00 per item

Animate your Basic programs with Arcade-speed Sprites

# SIMONSOFT SPRITES VERSION 2

@ £12.95 each BBC Model B

A devastating new sprites package! FASTEST EVER screen movement seen in Basic programs brought to your own character designs. All routines called from Basic, no knowledge of machine code is required.

Look at these features:

- 1 Pixel-by-pixel movement, resulting in a fluid-smooth motion of sprites. Yet even when moving one pixel at a time, a sprite may cross the screen 40 times in 13.5 seconds.
- 2 Up to 48 SPRITES on screen at any one time.
- 3 All 16 logical colours available in sprite design.
- 4 12 different base sprites each with up to 3 clones. Each sprite has independent screen images and movement control.
- 5 Two images for every sprite to allow ultra-smooth motion (left, righthand pixels). Can be defined separately for animation e.g. jumping frogs, running men, etc.
  - 6 COLLISION DETECTOR with hit flags set to the numbers of the sprites overlapping.
  - 7 SUPERSPRITES of up to 24 × 24 pixels. Can be moved as a single sprite, uses just two coordinate integers.
  - 8 Incredible ENLARGEMENT FACILITY allowing up to ×5 magnification of any sprites. Let your invaders loom out of the screen in 3-D effects!
  - 9 User-defined PRESET FLIGHT PATHS each with 8 directions of 255 steps.
- 10 Both EOR plotting and TRANSFER plotting available. EOR plotting allows sprites to cross background without disrupting it, transfer plotting cuts through background. Transfer plotting + background storage available for no disruption and no colour change as sprites cross background.
- 11 'Old' sprites deleted autormatically, screen boundaries crossed automatically.
- 12 TWENTY different sprite routines: optimise on speed and memory space by choosing the routine best suited to your program.
- 13 Routine deposited in RAM, write Basic as normal, then SAVE/LOAD your program and sprites as a whole.
- 14 Two arcade-speed demonstration games (inc. DEVII SWARM) using sprites.
- 15 Excellent manual accompanies package.
- 16 May be used in programs you wish to market.
- 17 Compatible with DISC/CASSETTE based system. Please specify.

PLEASE compare with other sprite packages
DON'T OPT FOR ANYTHING LESS

# SUPERFRUIT (32K) £5.95

Simply the best. Full colour high resolution graphics. Spinning reels with 'bounce'. Incredible gamble effects, hold, 3 types of gamble, swap reels, two-way nudge, nudge gambles, coin pile that shrinks/grows, great sound effects. Separate instruction program. This implementation is in a class of its own.

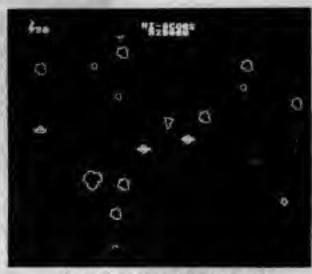
"You would be fully justified in claiming that it is better than the real thing" — M. Field, Oxford.



Actual screen photograph

# ASTROWARS (32K) £6.95

The up-to-date version of asteroid style programs. Your ship is trapped in an asteroid swirl and your only hope for survival is to blast a clear path through the asteroid cloud. Two types of alien saucer make your existence perlious. One homes in on your ship, the other strafes it while dodging your laser bolts. A unique feature allows you to set the speed of the action, the initial screen number, and the frequency of both kamikazi and strafer saucers.



Actual screen photograph

Please order from

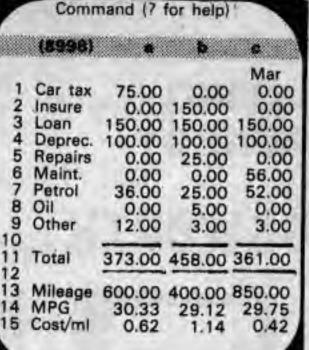
SIMONSOFT, 25 TATHAM ROAD ABINGDON, OXON OX14 1QB

For prompt despatch — Dealer and foreign distributor enquiries welcome



## CONTEX

Professional Software for the BBC Computer



#### SPREADSHEET 32K

A complete and versatile 'calc' program and tutorial. Models over 1,000 cells using up to 26 columns and 99 rows. Equations, constants, data or text in any cell. Emphasis on ease of use. 10 chr columns; 9 digit accuracy; print; row & col insert or delete; functions; colour; variables; save & restore; copy cell; auto replicate col & row; auto formulae adjust; scroll; search; help; evaluate; limits. 20 page instruction booklet.

Cassette £9.99 inc.

#### **NEW FOR DISCUSERS**

If you are seeking a top quality spreadsheet for financial or statistical analysis you need look no further. The enhanced disc spreadsheet has all of the facilities of SPREADSHEET 32K PLUS individual field widths and decimal formats, more help, use cell coordinates or headings, additional preprogrammed functions, access to DSF commands and more!

DISC SPREADSHEET £12.99 inc.

(existing tape users return tape and £6.00 for upgrade)

#### **TYPING TUTOR 32K**

Specifically designed for the BBC micro the 90 smoothly graded lessons and the free form option teach and encourage fast touch typing. Intelligently checks for errors, monitors progress, times (WPM) and makes recommendations. Audio key feedback, metronomic pacing, clock and revised performance options. Auto keyboard/finder display for every lesson. Add own lessons if required. 12 Page instruction booklet.

> Cassette £9.99 inc. Disc £11.99 inc.

Fast delivery. Discs supplied are 51" please specify if 40 or 80 track required.

CONTEX COMPUTING (B2) 15 Woodlands Close, Cople, Bedford MK44 3UE.

#### **EPROM PROGRAMMER for 12K ATOM** and BBC B

Designed as a low cost practical solution for the serious computer hobbyist. Program supplied on tape. Plugs into Acorn bus connector on Atom and into user port on BBC machine.

NOTE - 6522 VIA must be fitted to Atom and BBC machine together with appropriate external connectors.

NEW MODEL - Will program 2716, 2532 & 2732 on 12K Atom (larger ROMs if extra memory available). Will program 2716, 2532 2732 & 2764's on BBC Model A and additionally 27128's on the Model B (or 32K 'A' with 6522 fitted). MENU DRIVEN - it will:

1 Copy from EPROM into memory 3 Verify EPROM against memory 2 Copy from memory into blank 4 Check for blank EPROM **EPROM** 

Software supplied on tape can also be put into EPROM Supplied in a sloping box complete with connecting cable, instructions, standard 28 pin socket

only £35 +VAT p&p £1 or including a high quality textool 28 pin ZIF socket ONLY £45 +VAT p&p £1

ROM EXPANSION CARD FOR ATOM

Plugs into utility ROM socket inside case. Allows up to 4 off 4K EPROMS to be software selected. Assembled and tested board. £13.00 + VAT + 50p p&p

SIDEWAYS ROM EXTENSION RAM/ROM CARD FOR BBC Allows up to 13 additional ROMS to be fitted OR 16K or RAM + 5 additional ROMs. Provision also for 2 of the sockets to be used to hold 2764's and to simulate a 16K ROM. All address and data lines fully buffered.

RAM allows programs to be downloaded from disc or tape and run as a sideways ROM. Any write signal to the sideways ROM area will appear in the RAM.

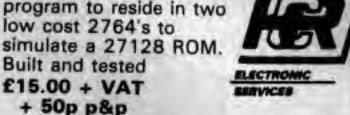
Also will allow programs to be developed for subsequent insertion into sideways ROM.

High quality PTH Board, assembled and tested.

£29.50 + £1 p&p

#### BUTTERFLY BOARD FOR BBC

Fits into one of the sideways ROM sockets and allows a 16K program to reside in two low cost 2764's to simulate a 27128 ROM. Built and tested



Orders and further details **HCR Electronic Services** The Industrial Unit Parker Road Chelmsford

Essex CM2 0ES Tel: (0245) 350188

## Micro/T.V. Adaptor

Do you get fed constantly unplugging your T.V. ariel, fitting your micro lead behind your T.V., and then having to change back? Use this Adaptor and a simple switch beside the connects or disconnects your micro.

Switch on, change channel and your micro has its V.D.U., switch off, change channel and you have your T.V. Easily fitted in 15 seconds.

£7.99 complete (incl. p&p)

Send cheque/P.O. together with Name, Address, Make & model of micro to: MR H. ALLEN,

Milford House, **Bolt House Close, Tavistock. DEVON. PL19 8LL** 

# The best in books and software for the BBC Micro

#### USING BBC BASIC

by P.J. Cockerell

This book aims to develop both skills in BBC BASIC and a more intimate know-ledge of some of the special features on the BBC Microcomputer. Programs as well as text are presented in an easy and accessible style and the emphasis is very much on developing various techniques and skills by actually using the programs provided.

0471 90242 X

392pp

£6.95

#### A YOUNG PERSON'S GUIDE TO BBC BASIC

by M. Milan

This book is a friendly programming primer which assumes no previous knowledge or experience of computing. It emphasises the advantages of a structured approach to programming, paying particular attention to good programming technique. Helpful hints for overcoming problems and making programming easier are given throughout the book.

085012 393 3

116pp

£4.50

Published by the National Computing Centre and marketed by John Wiley and Sons Ltd.

#### COMPUTING FOR ALL THE FAMILY WITH A BBC COMPUTER

by T. Noble

Following the tremendous success of *The VIC-20 for Children*, Tony Noble has now written a similar book for the popular BBC computer.

The book begins with an introduction to the uses of microcomputers then takes you through about 50 short simple, easy-to-follow steps that take you from turning on the computer to advanced BASIC programming. These have been thoroughly tested in schools with outstanding success

0905104587

180pp

£5.95

Published by Sigma Technical Press and marketed by John Wiley and Sons Ltd.

#### MY SECRET FILE

by Phil Nathans
Based on the best-selling book by
John Astrop

A personal database for your darkest thoughts.

VOCABULARY

FRENCH

Do you have secrets you wouldn't even confide to your closest friend? Let alone your family?

At last, you're no longer alone. My Secret File turns your personal computer into a personal confidente. And to keep your confidences confidential, it's even password protected — because these days, you can't even trust your micro not to blab.

0946855 404 book/cassette pack £9.95
Published by Mosaic Publishing Ltd. and marketed by John
Wiley and Sons Ltd.

#### THE UNORTHODOX ENGINEERS: The Pen and the Dark

by Keith Campbell
Based on the story by Colin Kapp

Colin Kapp created the classic SF stories about the Unorthodox Engineers — and now you can try to solve the mystery of the indestructible pillar of darkness and the riddle of contra-energy in this mindbending text adventure game.

By special arrangement with an unspecified alien culture, Mosaic will let you have the story along with the program — so at least you're in with a chance. Please read the story carefully... because we'd like to release our Spring SF bookware blockbuster (Harry Harrison's Stainless Steel Rat on micro for the first time!) before you carelessly unleash contra-energy across the universe. Thank you.

0946855 20X book/cassette pack £9.95

Published by Mosaic Publishing Ltd. and marketed by John Wiley and Sons Ltd.

#### TENSE FRENCH: Know Your Verbs

FRENCH

KNOW YOUR VERRS

by Sulis Software

Tense French teaches you how to get those basic French verbs (regular and irregular) right. The little beasts are translated, listed and tested, so that whether you've a gift for languages or not, these common verbs won't bother you again.

0946658552

£9.95

Published by Sulis Software Ltd. and marketed by John Wiley and Sons Ltd.

#### JUST A MOT: Vocabulary

by Sulis Software

A bi-lingual program for learning 1000 useful and up-to-date French words. There are five vocabulary areas: Travel, Shopping, Food, Drink and Essentials. Work from English into French, or vice versa, with a choice of games or key-in options.

0946658 35 8

£9.95

Published by Sulis Software Ltd. and marketed by John Wiley and Sons Ltd.

#### COMPUTER BOOK MONTH

The books and software featured in this advertisement plus many other titles will be on display at leading bookshops and computer stores in the UK during March 1984.

For a checklist of titles please write to

Annabella Duckit,
John Wiley & Sons Ltd,
FREEPOST, Baffins Lane,
CHICHESTER, West Sussex
PO19 1YP, England



#### John Wiley & Sons Limited

Baffins Lane · Chichester Sussex PO191UD · England

## CHEMIPLANT



# H SOFTWARE H

PRESENTS 3 NEW TAPES

for the

#### **BBC 32K COMPUTER**

to add to their existing range of games and educational software.

#### LOONEY LIFT

A new action packed arcade game with hi-res graphics, full colour and sound. Keep your guests jumping, operate the lift and watch out for the luggage. The alternative is the sack!

£7.50

#### CHEMIPLANT

Another first? A chemical plant simulation. Avoid explosions, spills and other disasters on your way to your first million. Plant manual included. Hi-res graphics.

£7.50

#### STORY

Electronic storytelling!

First make up some scenes using pictures from the computer bank or use your own drawing skills. Then write your story. Up to 7 screens can be displayed, saved and printed.

£6.50

To get more information about our new and existing software, ask for a catalogue. Please send a s.a.e.

\*\*\* Disc versions available: please add £1.50 \*\*\*

Please send orders and cheques/PO to:

H & H Software, Dept M, 53 Holloway, Runcorn, Cheshire WA7 4TJ. Tel: 09285 65566

# NOW EVERYBODY CAN BE A SWIFT PROGRAMMER!!!

The new Swift Programmer Pack contains specially printed sheets to help accurately position type and graphics on the screen.

Each Pack contains 100 printed surfaces each of:

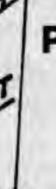
TEXT GRID ONE . . . For use with Modes 1, 2, 4 & 5 TEXT GRID TWO . . . For use with Modes 6 & 7 GRAPHICS GRID . . . 1280  $\times$  1024 gu in steps of 50 CHARACTER DEFINITION GRID . . . Numbered 8  $\times$  8

squares for easy reference

PLUS . . . A5 binder to hold pads

If you own a BBC or ELECTRON micro, Swift Programmer

Packs can help make your programming easier and faster.



#### PACKS AVAILABLE AT ONLY £5.95 each



(+ please add £0.95 p&p)

#### **SWIFT READER**

FOR BBC MICRO

A suite of eight programs designed to help children (age 4 +) learn to read.

This package takes children from simple letter recognition, through to the reading of a simple story, incorporating "Variable Text Read Out" speed options.

Swift reader ref. Swift 8

# SWIFT G.C.E. HISTORY

Three packages, each containing TWO programs, designed to be used as G.C.E. O'Level Study and Revision aids, with text and test facilities.

SWIFT 6 . . . Hitler's Germany 1933-1939
Mussolini's Italy 1919-1939
SWIFT 7 . . . Lenin's Russia 1917-1924
Stalin's Russia 1924-1939
SWIFT 9 . . . USA in the 1920's
Roosevelt's new deal

CASSETTES £9.95 each inc.
DISCS £11.95 each inc.
All programs are for 32k micros

Send cheque/P.O. with details of Packs/Tapes/Discs required to:

SWIFT MACHINE SOFTWARE
154 Greenfield Road, Holmfirth
Nr. Huddersfield W. Yorks HD7 1LP
or send for further details

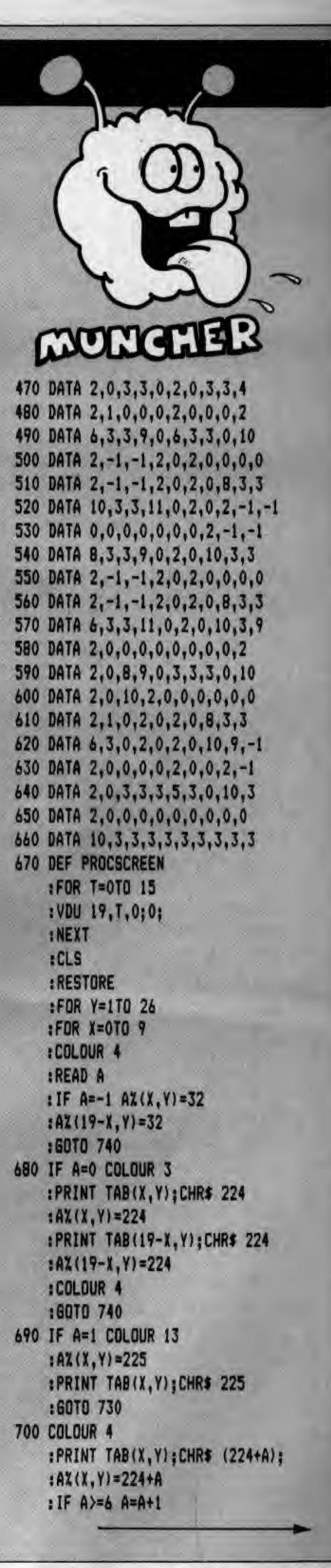
#### Mazemunch listing

#### From Page 66 100 FOR TX=0TO N6X-1 : PROCGHOST : NEXT :UNTIL LIVES%=0 110 RUN 120 DEF PROCEHOST : PROCHOVE :COLOUR 3 :IF OGX(T%)=225 COLOUR 13 ELSE IF OGX (TX) = 238 COLOUR O 130 IF TIME <(12-SCREEN%) \*100 VDU 19, TX+1,8;0; ELSE VDU 19, TX+1, TX+1;0; 140 IF PEEK%=-1 A%(10,10)=32 :PRINT TAB(10,10); CHR\$ 32 150 IF XX=6XX(TX)+D6XXAND YX=6YX(TX)+ DGYXAND TIME >(12-SCREENX) \*100 PROCDIE 160 PRINT TAB(GXZ(TZ), GYZ(TZ)); CHR\$ (DG%(T%)); : A% (GX% (T%), GY% (T%)) = OG% (T%) : 06% (T%) =A% (6%% (T%) +D6%%,6Y% (T%) + D6Y%) : GXX (TX) = GXX (TX) + DGXX :6Y% (T%) =6Y% (T%) +DGY% : COLOUR TX+1 :PRINT TAB(GXX(TX), GYX(TX)); CHR\$ 238 :AX(GXX(TX),GYX(TX))=238 : ENDPROC 170 DEF PROCHOVE : DGX%=0 : DGY%=0 :PROCX : IF TIME ((12-SCREEN%) \*100 D6X%=-DGXZ : IF D6XX+6XX(TX)>190R D6XX+6XX(TX ) <0 DGX%=0 180 PROCPEEK : IF PEEK%>225 DGX%=0 190 PROCY : IF TIME ((12-SCREEN%) \*100 \*DGY%=-DGY% 200 PROCPEEK :IF PEEK%>225 DGY%=0 210 ENDPROC 220 DEF PROCX : DGXX=SGN (XX-GXX(TX)) :ENDPROC 230 DEF PROCY :DGYZ=SGN (YZ-GYZ(TZ)) : ENDPROC 240 DEF PROCPEEK : PEEK%=A% (GX% (T%) +DGX%, GY% (T%) +DG YX) : ENDPROC

250 DEF PROCMAN

```
:COLOUR 5
    :0%=0
    :P%=0
    :AX=INKEY (0)
    : *FX15,1
260 IF AX=-1ENDPROC
270 C%=C%+1
    : IF C%=238C%=236
280 IF AX=136PX=-1
290 IF AX=137PX=1
300 IF A%=90Q%=1
310 IF AX=65QX=-1
320 PRINT TAB(XX, YX); CHR$ 32;
    : AX (XX, YX) =32
    : IF XX+PX>19 XX=0
    :P%=0
    ELSE IF XX+PX(0 XX=19
    :PX=0
330 LX=AX(XX+PX, YX+QX)
340 IF LX=-1 AX(10,10)=32
    : SCX=SCX+10*RND(5)
    :SOUND 1,1,100,10
350 IF LX=224 SCX=SCX+1
    :EATZ=EATZ+1
    :SOUND 0,2,125,1
360 IF LX=225 SCX=SCX+10
    : EAT%=EATX+1
    :TIME =0
    :SDUND 1,2,255,20
370 IF L%>225AND L%<>238 P%=0
    :0%=0
380 IF LX=238AND TIME >(12-SCREENX)*1
    00 PROCDIE
    ELSE IF L%=238AND TIME < (12-SCREE
    N%) *100 PROCCHECK
    : PROCMUNCH
390 IF EATX>=212 COLOUR 5
    :PRINT TAB(XX+PX, YX+QX); CHR$ (CX)
    : PROCCOLOURS
    : PROCSCREEN
    : EAT %=0
    : PROCHEN
    : PROCREPLACE
    :SCREENX=SCREENX+1
    : PROCSCREENCOUNT
400 XX=XX+PX
    : Y%=Y%+Q%
    :PRINT TAB(X%, Y%); CHR$ (C%);
    :A%(X%,Y%)=32
    : COLOUR 3
    :PRINT TAB(4,0);SC%;
    : ENDPROC
410 DATA 8,3,3,3,3,3,3,3,4
420 DATA 2,0,0,0,0,0,0,0,0,2
430 DATA 2,0,8,9,0,8,3,9,0,2
440 DATA 2,0,2,2,0,2,-1,2,0,2
450 DATA 2,0,10,11,0,10,3,11,0,10
```

460 DATA 2,0,0,0,0,0,0,0,0,0



#### Mazemunch listing

Fr	om Page 151
-	COLOUR 4
	:C=0
	: IF A=8 A=9
	:C=1
340	ELSE IF A=10 C=1
1000	:A=8
720	IF A=10AND C=0 A=11
770	ELSE IF A=12AND C=0 A=10
750	PRINT TAB(19-X,Y); CHR\$ (224+A)
740	:A%(19-X,Y)=224+A NEXT
770	:NEXT
10	:AX(10,10)=32
34	:PRINT TAB(10,10);CHR\$ 32
	: VDU 20,19,8,1;0;19,9,2;0;
	:COLOUR 8
13	:PRINT TAB(0,0); "1UP "; TAB(9
	,0); "HIGH ";
100	:COLOUR 3
111	:PRINT ;H%
750	: ENDPROC
750	
760	DEF PROCCHARS
1. 1	:VDU 23,225,0,0,24,60,60,24 ,0,0,23,226,24,24,24,24,24,24
1 1	,24,24,23,227,0,0,0,255,255
130	,0,0,0,23,228,0,0,0,255,255
	,24,24,24,23,229,24,24,24,255
	,255,0,0,0,23,243,16,40,116
11.11	,116,116,254,24,0,23,244,0,16
- 200	,8,8,8,8,0,0
770	VDU 23,245,12,30,30,12,48,120
	,120,48,23,246,0,2,0,0,16,0
	,0,0,23,247,128,96,64,32,0,0
11	,0,0,23,248,111,172,237,185
100	0 0 0 54 23 250 0 120 120 120
. "	,0,0,8,56,23,250,0,128,128,128
	,36,72,16
780	
	,24,24,23,231,24,24,24,248,248
	,24,24,24,23,233,0,0,0,248,248
	,24,24,24,23,232,0,0,0,31,31
	,24,24,24,23,242,56,40,56,16
	,16,48,16,48,23,238,24,189,90
	,90,255,129,66,36,23,251,0,126
700	,255,255,255,126,124,56
/90	VDU 23,255,0,0,0,0,0,0,0,0,23
900	,254,145,82,0,195,0,36,65,129
000	VDU 23,234,24,24,24,31,31,0
(4)	,0,0,23,235,24,24,24,248,248
11/11	,0,23,236,90,60,90,255,129,129
4	,66,60,23,237,90,60,90,255,129
2.	,126,126,0,23,240,0,108,234
1 4	,254,254,254,124,56,23,241,24

```
: ENDPROC
810 DEF PROCINIT
    : XX=10
    : Y%=20
    : 9%=0
    :P%=0
    :L%=32
    : C%=236
    :EAT%=1
    :SC%=0
    : NGX=2
    :LIVES%=3
820 A$(0)=CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ 5+CHR$ 240+CHR$ 8+CHR$ 18+
    CHR$ 0+CHR$ 9+CHR$ 241+CHR$ 4
    :A$(1)=CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ 3+CHR$ 242+CHR$ 4
    :A$(2)=CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ 3+CHR$ 243+CHR$ 8+CHR$ 18+
    CHR$ 0+CHR$ 7+CHR$ 244+CHR$ 4
830 A$(3)=CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ 8+CHR$ 245+CHR$ 8+CHR$ 18+
    CHR$ 0+CHR$ 3+CHR$ 246+CHR$ 8+
    CHR$ 18+CHR$ 0+CHR$ 9+CHR$ 247+
    CHR$ 4
840 A$ (4) = CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ 6+CHR$ 248+CHR$ 8+CHR$ 18+
    CHR$ 0+CHR$ 4+CHR$ 249+CHR$ 8+
    CHR$ 18+CHR$ 0+CHR$ 3+CHR$ 250+
    CHR$ 4
    :A$(5)=CHR$ 5+CHR$ 18+CHR$ 0+
    CHR$ B+CHR$ 251+CHR$ 8+CHR$ 18+
    CHR$ 0+CHR$ 3+CHR$ 252+CHR$ B+
    CHR$ 18+CHR$ 0+CHR$ 9+CHR$ 241+
    CHR$ 4
850 FOR T=0TO NG%-1
    : 6X%(T)=7+T
    :6Y%(T)=15
    :06%(T)=224
    : NEXT
    :SCREEN%=1
    : AZ (XZ, YZ) = 32
    : COLOUR 5
    :PRINT TAB (X%, Y%); CHR$ (C%);
    :ENDPROC
860 DEF PROCDIE
    : COLOUR 13
    :PRINT TAB(XX, YX); CHR$ 254
    :FOR G=255TO OSTEP -10
    :SOUND 1,-15,6,1
    :NEXT
    :LIVESX=LIVESX-1
    :FOR T=OTO NGX-1
    : COLOUR 3
    :IF 06%(T)<>224 COLOUR 13
870 IF LIVES%=0 PROCDED
880 PRINT TAB(GXX(T),GYX(T));
```

CHR\$ (06%(T));

:AZ(GXZ(T),GYZ(T))=OGZ(T)

```
: GX%(T)=7+T
      :6Y%(T)=15
      : 06%(T) = A%(GX%(T), GY%(T))
      :A%(GX%(T),GY%(T))=238
      : COLOUR T+1
      : PRINT TAB(GX%(T), GY%(T));
      CHR$ 238;
      : NEXT
 890 AZ (XZ, YZ)=32
      :PRINT TAB(X%, Y%); CHR$ 32
      : C%=236
      : COLOUR 5
      : XX=10
      : YX=20
      :PX=0
      : 0%=0
      :PRINT TAB(XZ,YZ); CHR$ (CZ);
      : DGX%=0
      : DGY%=0
      : PROCHEN
      : ENDPROC
900 DEF PROCHUNCH
      :SDUND 3,3,100,10
      : SC%=SC%+50
      : COLOUR 3
      :IF 06%(T%)(>224 COLOUR 13
 910 IF 06%(T%)=225 SOUND 3,3,100
      ,10
      :TIME =0
  920 PRINT TAB(GX%(T%), GY%(T%));
      CHR$ (06%(T%));
      : A% (6%% (T%), 6%% (T%)) = 06% (T%)
      : GXX (TX) = 7+TX
      :6Y% (T%)=15
      :06%(T%) =A%(G%%(T%),GY%(T%))
      :A%(GX%(T%),GY%(T%))=238
      : COLOUR T%+1
      : PRINT TAB(GX%(T%), GY%(T%));
      CHR$ 238;
      : ENDPROC
  930 DEF PROCCHECK
      : 1%=-1
      :T%=0
      : REPEAT
      : JX=JX+1
      : IF 6X%(J%)=X%+P%AND 6Y%(J%)=Y%+Q
      % T%=J%
 940 UNTIL J%=N6%
```



March Issue **DEATHWATCH**, a superb arcade game BINGO, clever uses of the randomise function; BUBBLESORT routines; TESTS function keys in machine code. 0.1 COLOUR and GRAPHICS ROUTINES: create a kaleidoscope of screen designs.

Vol. 1, No. 1.



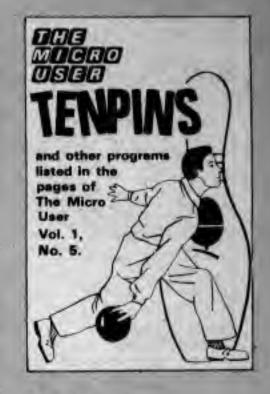
**April Issue** KING KONG, rescue girls from the Empire State Building before killing Kong. NIM, a structural game of strategy. TOKENS, unravel the Basic ROM: FORMATTER, an essential disc utility: DISASSEM, a full machine code disassembler.



May Issue AIR STRIKE, a fast and furious arcade game; Test your mental powers with PELMANISM; ANAGRAMS, the word game. CHARACTER, generate vertical and inverted text. TELETEXT, animation in Mode 7. BEEB, two joystick exercises.



June Issue SPACE PILOT, lost in space you must fight off repeated attacks from alien life forms. NOMISM, you are a nomadic herdsman desperately trying to eke out a living on the plains of Africa. COLOURFUL CHARACTERS PLUS other listings from the June issue.



July Issue TENPIN, a simulation of Tenpin Bowling: SPACEPODS, beat the alien hordes; CUP, Exciting 3D graphics techniques TEST and STEADY, programs to accompany the Beeb Body Building Course. BREAKFIX, Don't let Break destroy your precious variables!



August Issue

FRUITIES, driven by strange urges you climb the ladders of adventure to risk all in the gardens of unearthly frights. ANIMATION, a suite of programs that really bring your screen alive: CASDISC, the machine code downloader for your disc system; MODE 7 colour routines.



September Issue **ROBIN & MARIAN, rescue** Maid Marian from the Sheriff of Nottingham. GALACTIC INVADERS, an exciting arcade game. DFS BENCHMARKS, 14 DFS test programs. ANIMATION, new techniques. TERMINAL, connect a BBC Micro to a mainframe.



October Issue FISHING, a compulsive day's angling. JOYKEY, convert programs to joystick. PENTEST and BELLRINGER, for Micro User light pens. CONTOURS, an educational program. LINK BBC Micros to each other. PLUS all the listings from the first Electron User.



And all for £5.75 a disc, including post and packing. Of course, our very popular cassette tapes of the month's programs are still available. The price for these is unchanged - £3.75 a cassette, including post and packing.

We've even incorporated an automatic

menu downloader. Just boot up the disc,

make your choice from the menu, and away

Micro User programs

now on disc as well as

on cassette!

Now it's happened!

**ORDER FORM ON PAGE 169** 



**GOBLINS**, an enchanted journey. BLACKJACK, the casino favourite. CHARGE and PENDULUM, Body Building Course part 9. SIDEWAYS: programs in ROMs. PENDRAW, a light pen sketching program. PLUS all the programs from the

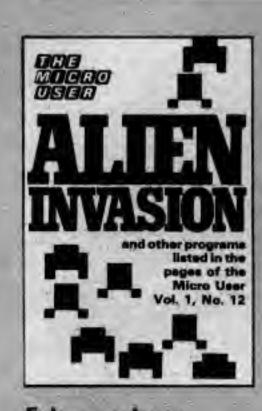
second Electron User.



December Issue TOWER, rescue London's treasure SANTA, help Father Christmas deliver his presents. VDU 23, an invaluable character defining utility. PAGED, the listing from our paged graphics article. PLUS all the listings from the third issue of Electron User.



January Issue BARRELS, an all-action arcade game. NOTEPLAY, an entertaining musical utility. DUMP1 and DUMP2, multitone screen dumps. All the programs from our SOUND, BEGINNERS' and GRAPHICS articles PLUS 12 programs from the fourth Electron User



February Issue INVASION, the classic arcade game. FROGS, fun for all the family. ENGVGEN, a logic game. BALANCE, a number learning program. KEY, single key entry for the **BBC Micro PLUS nine** other programs from The Micro User.



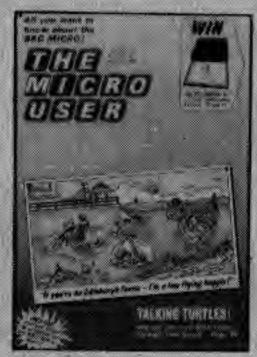
March Issue

MAZEMUNCH, blockbusting arcade action. BIRTHDAY, family fun for our anniversary. DERRICK, number fun for infants. PIXELPEN, high resolution for lightpens. LOADTAPE, a recovery utility. PLUS 18 other programs from the pages of Micro User.



March issue

Beginners: guide to the keyboard. Build your own games paddle. Word processor review. Guide to text colours and graphics. BBC operating system, Part 1. How to avoid cassette loading problems. Deathwatch listing. Upgrade Model A to B at half the shop price. Shapes program. Bingo listing. Sorting routines. Test for function keys in machine code routines. Colour monitors, Part 1.



August issue

Beginners: more help on loops. BBC Micro User's Manchester reviewed. Animation, Part 1. BBC Buggy and Edinburgh Turtle reviewed. Techniques for switching from tape to disc. Structured programming, Part 4. Inside King Kong: case study of the popular game. Fruities listing. A guide to logical operators. Machine code routines to give Mode 7 colour, Build your own dual cassette system.



October issue

Graphics: How to draw circles. Fishing. Structure, the last of the series. Format: We update the program. Make a light pen with Body Building Part 8. Editing: Print fields. The Hobbit reviewed. Workshop: Add joysticks to your games. Link Up: Join two BBC Micros. For . . . NEXT loops in Beginners' Part 7. Contour plotting program. Basicode, a computer communications language.



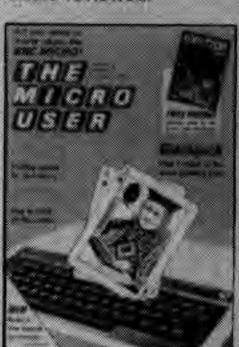
April issue

Beginners: simple programming. Impressive graphics with Teletext Mode 7. Common copying errors revealed. How to draw multi-coloured lines. King Kong listing. BBC Operating System, Part 2. Colour monitor review, Part 2. Upgrade Model A to B, Part 2. Finding the ROM's action addresses. Binary code and how to use it. Disc formatter listing. Plus 8-page pullout for Basic programmers.



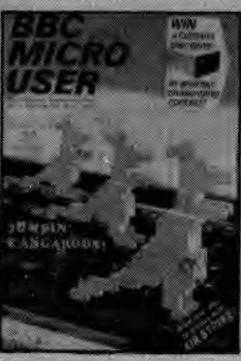
September issue

Animation Part 2. Editing course: use of TAB. Turn your BBC Micro into a graphics terminal. Galactic Invaders listing. Structured programming. Part 5. Two new DFS and APTL Eprom blower reviewed. Control the outside world safely with your BBC Micro. Robin and Marian listing. Workshop: variable storage explained. Beebcalc investigated. Inside the Electron: Acorn's latest micro reviewed.



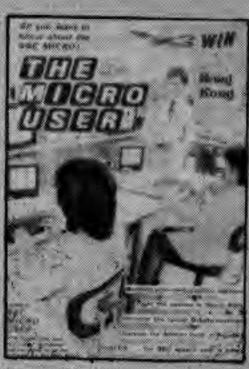
November issue

Beginners: guide to character codes. Light Pen, more useful software. Forth ROM reviewed. Blackjack, a compulsive simulation of the card game. Putting Basic programs into sideways ROMs. Goblins, a fun packed enchanted journey. Body Building Part 9, projects for the Physics lab. The SOUND command explained, Part 1. Games design: improve your programs.



May issue

Beginners: string variables. Pelmanism listing. Mode 7 animation, Part 2. Interfacing in the laboratory. How to generate vertical or even inverse text. Graphics course: triangles and rectangles. Build yourself a joystick. The Osbyte routine: full investigation. Air Strike listing. Anagrams listing. Structured programming, Part 1. How to make full use of the BBC's editing function.



June issue

Beginners: Use of the INPUT statement. Editing course: LIST and LISTO. Structured programming, Part 2. Solve cassette problems. Build your own graphics digitiser. Hidden \*FX calls. Guide to indirection operators. Single key memory display program. Space Pilot listing, Graphics course: text and graphics windows. Nomsim listing. Bring user defined characters to life. Speed chip review.



July issue

Beginners: loops. Ten Pins listing. Editing course: the PRINT statement. Graphics course: creating sunburst effects. Structured programming, Part 3. How to use the user port to maximum effect. Space Pods listing. Wordwise review. Epson FX80 printer review. The BBC Micro as a sophisticated design tool. Hexadecimal highlights. How to edit with impunity, and fix that break key.

# Make sure your MIICRO WISER collection is complete!

Back numbers are still available at £1.25 (incl. p&p)

ORDER FORM ON PAGE 169



December issue

Tower Bridge - ghostly encounters in the nation's capital. Paged Graphics: 6845 animation techniques. Character Definer an indispensible utility. Smartmouth reviewed. Sound explained, part 2. Body Building, a soundto-pattern converter. Beginners, working with strings. Slow Down, alters pace of your programs. Graphics: User defined characters. Santa's Saucer and Christmas Card.



January issue

Barrel Battle - an all action arcade game. Graphics, an easy to follow introduction to multiplane images. Noteplay, an entertaining musical utility. Body Building: add a DFS to your micro. Printing, Pixels, a multitone screen dump for Epson printers. Sound advice, flushing sound queues. Beginners, the use of TAB. Adventures, our regular column begins. Bits and Bytes investigates binary operations.



February Issue

Alien Invasion - Mode 7 action in this arcade blockbuster. Frogs'n'Dogs, a delightful game for all the family. Number Balance simple sums for children. Body Building, a real time clock. Sound Shaper, an easy-to-use envelope generator. Single Key Entry, save wear and tear on your fingers. DIY ROM board, full constructional details. Gallery, an intriguing logic game. Sound Advice, synchronising channels.

#### Mazemunch listing

#### From Page 152 : IF OGX (T%) >32 EAT%=EAT%+1 950 ENDPROC 960 DEF PROCHEN : COLOUR 5 : IF LIVESX>O PRINT TAB(9,13); STRING\$ (LIVES%-1, CHR\$ 236);" 970 ENDPROC 980 DEF PROCREPLACE :FOR T=OTO NGX-1 :6XX(T)=7+T : GY% (T)=15 : D6%(T) =A%(6%%(T),6%%(T)) :AX(GXX(T),GYX(T))=238 :COLOUR T+1 :PRINT TAB(GXZ(T),GYZ(T)); CHR\$ 238; : NEXT : DGX%=0 :DGY%=0 : X%=10 : YX=20 :P%=0 : 0%=0

```
: COLOUR 5
     :PRINT TAB(XX, YX); CHR$ (CX);
     : A% (X%, Y%) = 32
     :ENDPROC
990 DEF PROCSCREENCOUNT
     : IF SCREEN% (=20 FOR H=OTO SCREEN%
     -1
     : MOVE H*64,156
     :PRINT A$(H MOD 6);
     : NEXT
     : ENDPROC
     ELSE MOVE 0,156
     :PRINT A$ ((SCREENZ-1) MOD 6);
     : COLOUR 2
     :PRINT TAB(1,27); "="; SCREEN%
     : ENDPROC
1000 DEF PROCCOLOURS
     :FOR F=15TO 1STEP -1
     :FOR J=0TO 400
     : NEXT
     : VDU 19,4,F;0;
     : NEXT
     :CLS
     : ENDPROC
1010 DEF PROCFRUIT
```

:PRINT TAB(10,10);" "; :MOVE 640,700 :PRINT A\$((SCREEN%-1) MOD 6); :AZ(10,10)=-1 : ENDPROC 1020 DEF PROCDED : COLOUR 3 :PRINT TAB (5, 15); "GAME OVER" : IF SCX>HXHX=SCX 1030 COLOUR B :PRINT TAB(0,0);"1UP "; TAB(9 ,0); "HIGH "; : COLOUR 3 :PRINT :H% :FOR H=OTO 10000 : NEXT : RUN 1040 IF ERR = 17RUN ELSE REPORT :PRINT " at line ";ERL : #FX12,0 This listing is included in this

This listing is included in this month's cassette tape offer. See order form on Page 169.



#### **BASIC COMPILER**

Available now for the BBC Micro

A high preformance compiler at a realistic price.

Turns your Basic programs into super fast 6502 machine code. The compiler is very easy to use, and has the following features:

\* Accepts over 50 Basic keywords \* Handles 26 integer variables \* Full integer arithmetic

The program is supplied on cassette with full instructions for 32K B.B.C. Micro with 1.2 O.S.

Send cheques/PO's for £14.95 or S.A.E. details to:

PARKSOFTWARE

26 Romilly Park Road, Barry, S.Glam CF6 8RQ.

- Can you write intelligible English?
- Can you create brilliant programs?
- Are you capable of working with a bunch of lunatics?

Yes, you've guessed – we need an editorial assistant at Micro User and Electron User!

Send your application, together with examples of your work to:

The Editor, Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.



#### XTEND: EPROM UTILITY WITH OPTIONAL PROTECTION SYSTEM:

programmer: \*FIND,COUNT,REPLACE: any string combination replaced (Globally or Selectively) with user specified string (any length). \*CONDENSE: Intelligently and selectively removes REMs, comments, spaces, compacts lines into multi-statement lines. Removes empty lines. \*APPEND: joins code simply. \*KEYS: Display and edit function keys. \*MEM: memory summary with variables taken into account. \*STEP: much enhanced trace. Step through line by line at own pace. Numbers shown discreetly at top. Twin screens to protect graphics. Stop and interrogate variables any time. \*LIST: left justification of all statements. \*VAR: dump variable contents, FN and PROC locations. \*SINGLE generate 'single key' keywords — similar to Electron. \*FIX: recovers 'BAD PROGRAM's.

Calls may be prefixed with 'X' to avoid clashes with other ROMs.

PROTECTION SYSTEM (OPTIONAL) £7.95. Name and address (please print clearly) incorporated in XTEND. Displayed on screen on power-up.

DATABASE: £12.95. Make card-filing obsolete. Cassette/disc (32K): "Variable field length. "Fast sort/search any field. "Search and replace. "Specific, between-range, wildcard search. "Ammend, delete, replace.

Use as mailing list, school/class/club/business records, directories, inventories, catalogues, teaching resource where data compilation and classification are required.

EEL: £7.95 Fun way to learn number bonds/tables. Guide eel and eat the number family. 20 levels of difficulty, suitable for 6+ year olds. User performance record for teacher/parent.

WORDSQUARE: £7.95 Create wordsquares for any topic.

G.B. GEOGRAPHY: £7.95 High Res. maps of regions.

EURO-GEOGRAPHY: £7.95 High Res. Test your knowledge of countries and capital

cities.

PLOTAPIC: £7.95 Display/presentation program allowing pictures to be created using

PLOTAPIC: £7.95 Display/presentation program allowing pictures to be created using co-ordinate procedures. Results linked together to form story (Supplied with Nativity). Age range 8+.

GEMINI BUSINESS SOFTWARE: £17.95 HOME ACCOUNTS - MAILIST - STOCK CONTROL - SPREADSHEET - GRAPHPLOT - COMMERCIAL ACCOUNTS.

MICRO CASE: £35.00 +£3.00 p&p Strong, foam-lined, lockable. Holds BBC micro, recorder, disc drive, cassettes, cables. Black with aluminium trim.

EPROM BLASTING SERVICE Forget cassettes. Put your favourite program in a chip. Phone for details.

Cheque, Access/Visa (Phone anytime), Official order to:

#### PRIMASOFT.

FREEPOST, GLOSSOP, DERBYSHIRE SK13 9YB.

Add £3.00 per program for disc version. 50 p&p
Excellent royalties for quality Educational software
DEALER ENQUIRIES WELCOME

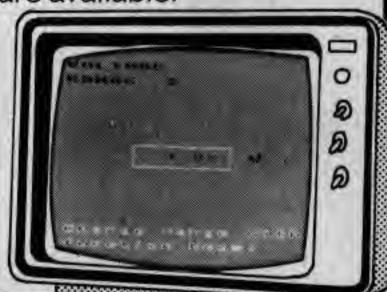
## 

Put your BBC Micro to good use in the electronic workshop/laboratory with this easy to construct Multimeter add-on. Simply plugs into the User and Analogue Ports to allow resistance, capacitance and voltage measurements to be displayed and read from the screen.

Measures: resistance up to 10 megohms (5 ranges)

capacitance up to 10 microfarads (5 ranges) voltage up to 100V dc (3 ranges)
Software available.

Although tailored for use with the BBC Micro model B, the hardware may be used with other computers equipped with an I/O and analogue ports.



EVERYDAY

ELECTRONICS

and computer PROJECTS

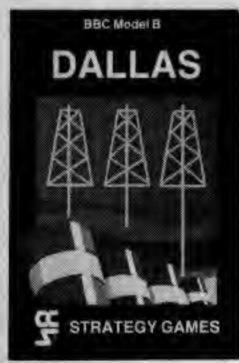
March 1984 on sale 17 Feb 90p

# PLANESAILING



#### Airline

Hijacks, strikes, crashes and spiralling fuel costs must all be overcome if you are to succeed at this game. A wing and a prayer will not be enough to turn your £3 million to £30 million in the time allowed, but your financial wizardry will enable you to take over British Airways, or will it?



#### Dallas

Can you amass enough petro dollars to take over the Euing empire. Cut throat business and an eye for the main chance may get you there but you'll need nerves of steel to overcome the oil king of Dallas.



#### Corn Cropper

Limited cash and droughts are two of the problems facing the farmer. Planting, fertilizing and harvesting must all be done economically if you are to reap the rewards offered in Corn Cropper. You choose the method that will bring you success.



## BUSINESS STRATEGY GAMES - £6.95

Selected titles available from Greens, Boots, Rumbelows and all good computer shops or Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.





# BBC ROM SION BOARD MODEL 2



#### THE ROM BOARD FOR THE BBC MICRO - NOW WITH RAM!

#### **NEW IMPROVED FACILITIES!**

- ★ 12 extra ROM sockets complement those already provided by the micro to allow up to 256K ROM space.
- ★ Four of these sockets can support either ROM or Static RAM (up to 16K maximum RAM).
- ★ The Model 2 board allows switching between multiples of 2K, 4K, 8K or 16K ROM/RAM.
- \* Fully buffered design.

#### NOW EVEN EASIER TO FIT!

- \* NO soldering, plug-in design.
- \* Fits easily inside BBC case.
- ★ Plugs into CPU socket via short flexibile connector.
- ★ Improved plug design allows the Model 2 board to connect securely to any type of BBC CPU socket with no harm to micro or board.
- \* Board is held in place by sturdy supports.
- \* Full instructions provided.

#### SIR BBC ROM EXPANSION BOARD MODEL 2: PRICE £40.00 + VAT

We also stock a complete range of BBC Micro peripherals and software, many at unbeatable prices! The following are just a small sample:

#### BBC MICROCOMPUTER

BBC Model B	£399.00
BBC Model BD	£469.00
MONITOR	2

#### PRINTERS

PHINIENS	
Dot Matrix:	
Epson FX-80	£399.00
Epson RX-80	£275.00
RX-80 F/T	
Shinwa CP-80	£263.35
Daisywheel:	
Juki 6100	£399 00

#### SOFTWARE

We have over 200 titles currently in stock including ROM based programs such as:

View	£59.80
HCCS Pascal	£59.50
Computer Concepts' Graphics	
ROM	£39.95
Wordwise	
Disc Doctor	£29.95

#### DISC DRIVES

DIGG DITTE	
Single 100K	£199.00
Dual 100K	£349.00
Dual 400K	£669.00

#### BUSINESS SYSTEMS

#### Torch Z80 Disc Pack:

This powerful and sophisticated unit interfaces with the BBC Micro to create a comprehensive business system. The Disc Pack includes; Twin 400K drives; Z80 second processor; 64K RAM;

#### Now with FREE Software

(Wordprocessor, database, spreadsheet & management game). The complete system is available for only £839.50!!

All our prices are inclusive of VAT unless stated otherwise.

#### Postage & Packaging:

Please add £1 P&P (small items: ROM Boards, etc.); £10 P&P (large items: Printers, Monitors, etc.).

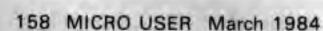
ACCESS/BARCLAYCARD TELEPHONE ORDERS WELCOME.



#### SIR COMPUTERS LTD.

91 Whitchurch Road, Cardiff, CF4 3JP. Telephone: (0222) 621813





#### From Page 73

tion should make the rest of the game clear.

#### **PROCEDURES**

PROCinstructions [1300] prints out the instructions for the game in Mode 7.

PROCinit [1460] sets up the constants for the game, dimensions the arrays, defines characters and logical colours and sets the initial numbers of gusts (number%).

PROCsetup [200] sets the scene for each new "sheet". It calculates the number of walls needed (W%), clears out and lit, puts the candle and flame on the screen and calls procedures to place the walls and gusts.

PROCplacewalls [1070] randomly places walls on the screen. A REPEAT ... UNTIL loop ensures that no wall is placed on top of another by using FNtest.

PROCplacegusts [370] randomly places the required number of gusts on the screen using FNposition to make sure there isn't another gust too close and FNtest to avoid walls.

PROCMOVEgusts [300] uses a loop to call PROCmovegust the required

number of times.

process [520] "intelligently" moves the gusts towards the flame by using the sign of the difference between the x coordinates, and that of the difference between the y coordinates to decide the directions horizontally and vertically the gust should move. It then picks one of these at random, occasionally allowing both — to give the dreaded diagonal movement. No movement is allowed if you run into the wall or the candle's wick (FNtest takes care of the rest of the candle!). Also, if a gust hits the flame, out is set.

PROC moveflame [680] flushes the keyboard buffer, then quickly checks to see if any movement keys are pressed, and if the move is legal. If you're slow you miss your go. The procedure beeps, then checks to see if any gust has landed on the flame — if so out is set.

PROCmusic [860] when you light the candle this plays . . . well, it's obvious isn't it?

FNtest [1220] checks to make sure a position doesn't contain a wall (using OSBYTE 135) or the bottom bits of the candle. We don't check for the

wick here as we want the flame to be allowed to reach it. Gusts are prevented from blocking it within PROCmovegust [650].

FNpostion [990] makes sure that the gusts are not placed too close to each other initially.

Error Check [1580] traps the Escape key. It also prints out details of other errors you may have made.

#### VARIABLES

w% Number of walls.
number% Number of gusts at that

flame.

light% Position of the moving flame.

flame% The position of the wick,

w%() Holds the positions of walls.
gust%() Holds positions of gusts.

Court Logical variable set if a gust "lands" on the flame.

Logical variable set if flame reaches the wick at flame%.

candle\$, Strings containing the user defined character shapes plus any necessary colour changes and cursor movements.

#### **Birthday listings**

10 REM (C) MICRO USER 1984

20 REM Michael Noels

30 ON ERROR GOTO 1600

40 MODE 7

50 PROCinstructions

60 MODE 1

70 PROCinit

80 REPEAT

90 PROCsetup (number%)

100 REPEAT

110 PROCMOVEgusts (number %)

120 IF NOT out

THEN PROCmoveflame

130 UNTIL out OR lit

140 IF 1it

THEN PROCHUSIC

:number%=number%+1

150 IF out

THEN SOUND 0,-15,5,20

160 UNTIL number%>20

170 CLS

:PRINT TAB(14,16) "Dkay, you win"

180 END

200 DEF PROCsetup(n%)

210 CLS

220 w%=40+2\*n%

:light%=20

230 out=FALSE

:lit=FALSE

240 PRINT TAB(20,31) candles;

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

250 PRINT TAB(light% MDD 40, light% DIV 40) flames:

260 PROCplacewalls

270 PROCplacegusts(n%)

280 ENDPROC

300 DEF PROCMOVEgusts(n%)

310 LOCAL loop%

320 FOR 100p%=1 TO n%

330 PROCmovegust (loop%)

340 NEXT Loop%

350 ENDPROC

370 DEF PROCplacegusts(n%)

380 COLOUR 2

390 LOCAL temp%, placed%, loop%

400 FOR 100p%=1 TO n%

410 placed%=FALSE

420 REPEAT

430 temp%=120+RND(24\*40)

440 IF loop%>1 AND FNposition(temp%, loop%) AND FNtest(temp%)

THEN placed%=TRUE

450 IF loop%=1

THEN placed%=TRUE

460 UNTIL placed%

470 gust%(loop%)=temp%

480 PRINT TAB(temp% MOD 40, temp% DIV 40) gust\$;

490 NEXT loop%

500 ENDPROC

510 REM =================

520 DEF PROCmovegust (loop%)

530 LOCAL x%,y%,1x%,1y%,1%,h%,v%,npos%,decide%

540 1x%=light% MOD 40

: lyX= light% DIV 40

550 x%=gust%(loop%) MOD 40

: y%=gust%(loop%) DIV 40 560 h%= S6N (lx%-x%)

: v% = SGN (1y%-y%)

570 IF h%=0

THEN npos%=v%\*40 + qust%(loop%)

580 IF v%=0

THEN npos%=h% + gust%(loop%)

590 IF h%=0 AND v%=0

THEN npos%=gust%(loop%)

600 decide%=1-RND(2)

610 IF h%(>0 AND v%(>0 AND decide%

THEN npos%=v%\*40+gust%(loop%)
620 IF h%<>O AND v%<>O AND NOT decide

#### Birthday listings

From Page 159	,4	USER'S ANNIVERSARY GAME*
	940 DATA 0,1,0,1,8,2,0,2,28,2,20	1350 PRINT TAB(4,11) CHR\$ (130) "You
THEN npos%=h%+gust%(loop%)	,3	must steer the flame from"
630 IF h%(>0 AND v%(>0 AND (RND(2*num	950 DATA 0,1,0,1,48,2,36,2,20,2	1360 PRINT TAB(4,12)CHR\$ (130) "the
ber%+3)=1)	,16,2	top of the screen to the"
THEN npos%=h%+v%*40+gust%(loop%)	960 DATA 8,2,40,1,40,1,36,2,20,2	1370 PRINT TAB(4,13)CHR\$ (130)"candle"
640 IF npos%=light%	,28,2,20,3,256,0	s wick, at the bottom."
THEN out=TRUE	970 ENDPROC	1380 PRINT TAB(12,15) CHR\$ (131) "left
:gust%(loop%)=npos%	980 REM ===================================	1700 DDINT TARKER (110004 (1711)
650 IF FNtest(npos%) AND npos%(1279	990 DEF FNposition(temp%,loop%) 1000 LOCAL pkay%,L%	1390 PRINT TAB(12,16)CHR\$ (131) "right
AND npos%(>1180	1010 okay%=TRUE	1400 DOTHT TARKER 1710UPA (1711U-
THEN PRINT TAB(x2,y2)" ";	1020 FOR L%=1 TO loop%-1	1400 PRINT TAB(12,17) CHR\$ (131) "up
PRINT TAB(npos% MOD 40, npos%	1030 IF ABS (gust%(loop%)-temp%)(25	1410 PRINT TAB(12,18) CHR\$ (131) "down
DIV 40) gust\$;	THEN okay%=FALSE	2"
:gust%(loop%)=npos%	:L%=100p%-1	1420 PRINT TAB(4,22)CHR\$ (132)
660 ENDPROC	1040 NEXT LX	CHR\$ (157) CHR\$ (131) "Press space
670 REM ===================================	1050 =okay%	bar to continue "CHR\$ (156)
680 DEF PROCmoveflame	1060 REM ===================================	1430 REPEAT
690 LOCAL key%, npos%, L%	1070 DEF PROCplacewalls	:UNTIL INKEY (-99)
700 npas%=light%	1080 LOCAL loop%	1440 ENDPROC
710 *FX15,1	1090 COLOUR 131	1450 REM ===================================
720 FOR L%=0 TO 10	1100 w%(1)=120+RND(26*40)	1460 DEF PROCinit
730 IF INKEY (-66) AND light%>39	1110 PRINT TAB(w%(1) MOD 40, w%(1)	1470 number%=2
THEN npos%=light%-40	DIV 40) wall\$;	1480 flame%=29*40+20
740 IF INKEY (-98) AND light%(1239	1120 FOR loop%=2 TO w%	1490 VDU 19,0,3,0,0,0
THEN npos%=light%+40	1130 REPEAT	:VDU 19,2,4,0,0,0
750 IF INKEY (-104) AND (light%	1140 temp%=120+RND(26*40)	:VDU 19,3,0,0,0,0
MOD 40 (>0)	1150 UNTIL FNtest(temp%)	1500 VDU 23;8202;0;0;0;
THEN npos%=light%-1	1160 w%(loop%)=temp%	1510 DIM gust%(20),w%(80)
760 IF INKEY (-105) AND ((light%+1)	1170 COLDUR 135	1520 VDU 23,225,0,0,0,0,16,16,16
MOD 40<>0) AND light%(1278	:PRINT TAB(temp% MOD 40, temp%	,16,23,226,56,56,56,56,56
THEN npos%=light%+1	DIV 40) wall \$;	,56,56,23,227,16,56,56,124,124
770 NEXT	1180 NEXT 100p% 1190 COLOUR 128	,56,16,0,23,228,36,60,255,60
780 SOUND &11,-10,50,4	1200 ENDPROC	,60,255,60,36 1530 wall\$=CHR\$ (17)+CHR\$ (2)+"#"
790 IF nposX=flame%	1210 REM ===================================	1540 candle\$=CHR\$ (17)+CHR\$ (2)+
THEN lit=TRUE	1220 DEF FNtest(temp%)	CHR\$ (225)+CHR\$ (8)+CHR\$ (10)+
800 IF npos%(>light% AND FNtest(npos%	1230 LOCAL CX.A%	CHR\$ (226)+CHR\$ (8)+CHR\$ (10)+
)	1240 okay%=TRUE	CHR\$ (226)
THEN PRINT TAB(light% MOD 40	1250 VDU 31,temp% MOD 40,temp%	1550 flame\$=CHR\$ (17)+CHR\$ (1)+
, light% DIV 40)" ";	DIV 40	CHR\$ (227)
:light%=npos%	1260 AX=135	:gust\$=CHR\$ (17)+CHR\$ (3)+
810 PRINT TAB (light% MOD 40, light%	:COLOUR 135	CHR\$ (228)
DIV 40)flame\$;	1270 C%=(USR (&FFF4)AND &FFFF)	156C ENDPROC
820 FOR LX=1 TO number%	DIV &100	1570 REM ===================================
:IF gust%(L%)=light%	1280 COLDUR 128	1580 REM ===== Error Check ======
THEN out=TRUE	:=(C%(>35) AND temp%(>1220	1590 REM ===================================
830 NEXT L%	AND temp%(>1260	1600 IF ERR =17
840 ENDPROC	1290 REM ===================================	THEN RUN
850 REM ===================================	1300 DEF PROCinstructions	ELSE MODE 6
B70 REPEAT	1310 VDU 23;8202;0;0;0;	:VDU 19,0,4,0,0,0
880 READ pitch, duration	1320 PRINT TAB(10,4) CHR\$ (141)	: REPORT
890 SOUND 1,-15,50+pitch,3*duration	CHR\$ (132) CHR\$ (157) CHR\$ (131)	:PRINT " at ";ERL
900 SOUND 1,0,0,0	"BIRTHDAY "CHR\$ (156)	: END
910 UNTIL pitch=256	1330 PRINT TAB(10,5)CHR\$ (141) CHR\$ (132)CHR\$ (157)CHR\$ (131)	This listing is included in this
920 RESTORE	"BIRTHDAY "CHR\$ (156)	month's cassette tape offer. See
930 DATA 0,1,0,1,8,2,0,2,20,2,16	1340 PRINT TAB(4,8)CHR\$ (129) "MICRO	order form on Page 169.
	Total Indiana Contraction	

160 MICRO USER March 1984

# BEST CHOICE BEST SERVICE BEST BUYS

come and see for yourselves

choice selection friendly service

- **+** Electron
- **+**BBC
- Sinclair
- Dragon
- ♦ Vic 64
- Printers/Disk Drives
- Plenty of Software
- Books, games plus help and advice

BBC

Special stocks of BBC computers
ALL AVAILABLE NOW AT THESE FRIENDLY LOCAL CENTRES



II2 EAST STREET

SOUTHAMPTON

Tel: 0703 24703

northern
computers

Churchfield Road
FRODSHAM Ches.
Tel: 0928 35110







Please send me Sea Wolf for the Acorn Electron.

I enclose remittance of £6.95, plus 50p post & packing.\*

Total: £7.45.

Post free for 2 or more.

Address .....

☐ I enclose cheque made payable to Optima Software Ltd.

Optima Software Ltd., 36 St. Petersgate, Stockport SK1 1HL.

☐ I wish to pay by

No.....

□ Access □ Visa

Expiry date .....

With a touch of brilliance

#### Denary Derrick listing

From Page 57	,3,224,225		
	360 VDU 18,0,0,8,232,255		oduced using a special
10 MODE 7	:MOVE AX-32, BX-32	formatter which br	eaks one program line
:PROCintro	:VDU 233,8,18,0,3,229		s of listing. When
20 VDU 23,0,8202;0;0;0;	,9,230,8,18,0,0,234		't press Return until
30 PROCdefine	,8,8,255	The second secon	ext line number. Full natter are in the July
40 REPEAT	370 MOVE AZ,BZ	1983 issue of The	
50 REPEAT	:VDU 18,0,15,227,227		
:A\$=GET\$	380 MOVE AX.BX		
:UNTIL INSTR("12",A\$)()0	:VDU 18,0,8,226,226	:LDX#111	:STAXZ+&32
60 men=3	390 MOVE AX+32,BX	:.L00P5	:RTS
:score=0	:VDU 18,0,1,228	620 LDAYX+215,X	700 .CHRI LDAXX+&3
70 REPEAT	400 MOVE AX+32, BX-38	:STA&7710-640,X	: CMP#&80
80 MODE 2	:VDU 18,0,0,255,8,18	630 DEX	:LDAX2+&3D
:PROCinit	,0,7,48+N%	:BPL LOOP5	:SBC#&75
:CALL RESET	410 ENDPROC	#RTS	:BCC RIGHT
90 REPEAT	420 REM	640 .RIGHT CLC	:RTS
00 PROCspider	430 DEF FNHIT (a%, b%)	:LDAXX+6	710 LEFT SEC
10 *FX15,1	440 =POINT(a%,b%)+POINT(a%+12	:ADC#16	:LDAXX+&31
20 TX=INKEY (10)	8,6%)+POINT(a%+32,6%-64)+	:STAXX+6	:SBC#16
:IF TX=KEYX 7&70=-1	POINT (a%+96,b%-64)+	:LDAXX+7	:STAXX+&31
4SX=-15	POINT(a%+64,b%+8)	:ADC#0	:LDAX%+&32
30 PROChase	450 REM	STAXX+7	#SBC#0
40 UNTIL BX<280 DR FNHIT(AX	460 DEF PROCdefine	650 CLC	:STAX%+&32
.B%)(>0	470 6%=0	:LDAXX+&11	
50 IF B%(280 PROCland	:HZ=0	:ADC#16	720 SEC :LDAX%+&26
ELSE PROCexplode	480 DIM XZ 600, YZ 500	:STAXX+&11	:SBC#16
60 PROCupdate	490 P%=X%	:LDAXX+&12	:STAX%+&26
70 UNTIL men=0	500 COPTO	:ADC#O	:LDAXX+&27
80 MODE 7	510 .BASE LDX#47	:STAXX+&12	:SBC#0
:PROCanother	520 .LOOP1 LDA Y%-1.X	560 CLC	:STAX%+&27
90 UNTIL FALSE	:STA&7228-624,X	:LDAXX+&1C	730 SEC
00 END	530 DEX	: ADC#16	:LDAXX+&3C
10 REM	:BPL LOOP1	:STAXX+&1C	:SBC#16
20 DEF PROChase	:LDX#55	:LDAXZ+&1D	:STAXZ+NJC
	:.L00P2	:ADC#0	
30 SOUND 1,-7,30,1 40 IF INKEY (-104)=-1	540 LDA YZ+31.X	:STAXZ+&1D	:LDAXX+&3D
CALL CHRI	:STA&74A8-632,X		:SBC#0
	550 DEX	670 CLC :LDAXX+%26	:STAXX+&3D
50 IF INKEY (-103)=-1			740 SEC
CALL CHLE	:BPL LOOP2	:ADC#16	:LDAXX+&1C
60 IF ?&70=255 SOUND 0	:LDX#55	:STAXX+&26	:SBC#16
,8%,30,10 .6%-6%4 7	:.LDDP3	:LDAX%+&27	:STAX%+&1C
:5%=5%+.3 -CALL CHUD	560 LDAY%+71,X	#ADC#0	:LDAXX+&1D
:CALL CHUP	:STA&7728-632,X	:STAXX+&27	:SBC#0
70 CALL BASE	570 DEX	680 CLC	:STAXZ+&1D
80 ENDPROC	:BPL LOOP3	:LDAXX+&3C	750 SEC
90 REM	580 LDX#60	:ADC#16	:LDAX%+&11
00 DEF PROCspider	:.L00P6	:STAXZ+A3C	:SBC#16
10 BZ=BZ-16	:LDA#00	:LDAXI+&3D	:STAXX+&11
: IF AX(100 CHX=RND(12)	:STA&7730,X	: ADC#0	:LDAXX+&12
20 IF AX>1000 CHX=-RND(12)	: DEX	:STAXX+&3D	:SBC#0
30 AX=AX+CHX	:9PL LOOPS	690 CLC	:STAX%+&12
40 MOVE AX-32, BX+32	590 LDX#111	:LDAXZ+&31	760 SEC
:VDU 18,0,0,255,255	600 .LODP4 LDA YX+119,X	:ADC#16	:LDAXZ+&6
,255	:STA&7490-640.X	:STAXZ+&31	:SBC#16
50 MOVE AZ-64,BZ	610 DEX	:LDAXX+432	
:VDU 255,231,8,18,0	:BPL LOOP4	: ADCNO	

From Page 163	: B 840 LD	BCC LOOP9	900	FOR P%=0TO 15 STEP 4 :Y%!P%=&00000000	1160	Y%!271=&30202020 :Y%!275=&10101010
				:YX! (PX+31)=&00000000	1170	YX!279=&00000000
-CTAVY		STA&70			1170	
:STAXX+&6		RESET LDAXX+&3C		:YX! (PX+71)=&00000000	1100	:Y%!283=&20000000
:LDAXX+&7		CLC		: Y%! (P%+119) =&00000000	1180	Y%!287=&30101010
:SBC#0		ADC#&AO	Tail .	: YZ! (PZ+215) =&000000000	1100	:Y%!291=&30101010
:STAXX+&7		STAXZ+&26	100	:YX!(PX+311)=&00000000	1190	YX!295=&30202030
RTS		.DAX%+&3D	1000	:NEXT PZ	4000	:YX!299=&10101030
770 .CHLE LDAX%+&3C		ADC#2		YX?-1=00	1200	YZ!303=&30000000
:CMP#&90		STAX%+&27	920	YZ!15=&03010101		:Y%!307=&20000020
:LDAX%+&3D		.DAX%+&26		:YX!19=&03030303	1210	VDU 23,224,33,127,227
:SBC#&73		STAXZ+&11	930	YZ!23=&02000000		,231,127,60,121,144
:BCS LEFT	:	DAXX+&27	1.4	:Y%!27=%02020202	100	:REM HEAD
:RTS	:5	SEC	940	YX!47=&01010101	1220	VDU 23,225,132,254,199
780 .FIRE SEC	49	SBC#5	1000 N	:YZ!51=&01010101	(1)	,231,254,60,158,9
:LDAXX+&6	:5	STAXZ+\$12	950	YX!55=&03030303		:REM HEAD
:SBC#&80	: i	DAXZ+&31	3.7	:YX!59=&03030303	1230	VDU 23,226,0,0,8,8,0
:STAXX+&6	:0	CLC .	960	YX!63=&03030303		,0,0,0
:LDAXX+&7	:A	ADC#&AO	4,1	:YX!67=&03030303		:REM EYES
:SBC#2	:S	STAXX+&1C	970	YZ!87=&02030301	1240	VDU 23,227,0,0,16,16
:STAXZ+&7		AXX+&32		:YZ!91=&00000002		,0,0,0,0
790 SEC	:A	DC#2	980	YZ!95=&A1A10303		:REM EYES
:LDAX2+&11		STAXZ+&1D	-	:YX!99=&5050F0F0	1250	VDU 23,228,0,0,0,0,0
:SBC#&B0		DAXX+&1C	990	YZ!103=&A0A10303		,60,102,60
:STAXX+&11		CC	1 7 7	:YZ!107=&000000A0	1. 5.1. 1	:REM MOUTH
:LDAXZ+&12		DC#8	1000	Y7:111=&02020200	1260	VDU 23,229,18,36,68
:SBC#2	THE STATE OF THE S	TAXZ+&6	- 777	:YZ!115=&00000002		,66,65,32,32,16
:STAXX+&12		DAXZ+&1D	1010	Y%!139=&00000000	17/25	:REM LEGS
800 SEC	(5)	SEC		:YZ!135=&00101000	1270	VDU 23,230,72,36,34
:LDAXX+&26		BC#5	1020	YZ!147=&10101010		,66,130,4,4,8
:SBC#480		TAXX+&7	1929	:YZ!143=&30103000		:REM LEGS
:STAX%+&26		TS	1030	YZ!155=&30202030	1200	VDU 23,231,222,128,28
:LDAXX+&27		EAR LDA#&30	1030	:YZ!151=&20203000	1200	
:SBC#2			1040	YZ!163=&30000000	1200	,24,128,195,134,11 UNU 23 232 123 1 54
		STA TEAR+&14	1040		1270	VDU 23,232,123,1,56
:STAXX+&27		TA TEAR+&18	LAFA	:YZ!159=&20103000	1700	,24,1,195,93,146
BIO SEC		TA TEAR+&1C	1000	YX!171=430100010	1500	VDU 23,233,237,219,187
:LDAXX+&1C		TA TEAR+&20	1	:YZ!167=&20003000	1710	,189,190,223,223,239
:SBC#&80		DY#60	106	0 YX!179=&30102010	1310	VDU 23,234,183,219,212
:STAXX+&1C	200	DDP10 LDX#00	0.00	:YX!175=&00003000		,189,125,251,251,247
:LDAXX+&1D		L00P11	107	0 YX!187=&30000000	1320	VDU 23,255,255,255,255
:SBC#2	- J.	DA&3000,X		:YX!183=&20103000		,255,255,255,255
:STAX%+&1D		SLA	108	0 YZ!195=&30000010	1330	ENVELOPE 1,3,10,20,-10
:RTS	The second secon	TA&3000,X	- 1 To	:YZ!191=&20003000		,40,20,60,20,0,-5,-2
820 .CHUP LDAXX+&7		EX	109	0 YX!203=&30303030	a diament	,126,126
:CMP##32	:L	DA&3000,X	110	:YX!199=&30303000	1340	ENDPROC
:BCS FIRE	:L	SR A	110	0 Y%!211=&00000000	1350	REM
830 LDY#&30	:5	TA&3000,X		:Y%!207=&20103000	1360	DEF PROCintro
:LDA#00	H: D	)EX	111	0 YZ!231=&10000000	1370	FOR Q=1TO 2
:.L00P9	: B	NE LOOP11		:Y%!235=&00000000		:PRINT TAB(10,Q);
:LDX#0	:1	INC LOOP11+&2	- 112	0 YZ!239=&30000010		CHR\$ 141; CHR\$ 131; "DENAR
:.L00P8	: I	NC LOOP11+&6	in the State	:YZ!243=&30101030		DERRICK"
:STA&3000,X		INC LOOP11+&A	113	0 YX!247=&30303030		: NEXT
*DEX	- 12.5	NC LOOP11+&E	17 19	:YX!251=&10101030	1380	PRINT TAB(9,3); CHR\$ (130
: BNE LOOP8		DEY	114	0 YZ!255=&20000000		**====================================
: INY		INE LOOP10		:Y%!259=&20000000	1390	PRINT TAB(0,4); CHR\$ (134
:STY LOOP8+&2		RTS	115	0 YZ!263=&10000000		
:CPY#&38	890 1	The second secon		: Y%!267=&30101010		

# SOFTWARE FOR THE BBC MICRO

#### GREMLIN

This is a machine language monitor ROM designed for use as an aid to development and debugging of machine code programs.

Anyone writing machine code programs will at some time come across a bug in the program. Trying to track down the bug is usually far from easy and this is where GREMLIN will prove invaluable. The ROM contains a full machine code monitor including features such as a disassembler, memory move and search routines etc.

GREMLIN includes many advanced features like a full expression evaluator, and an assembler. It can single step through programs both in RAM and ROM and allows operation on any sideways ROM. Variables may be declared and used in expressions and with most commands much like BASIC. This makes the system very powerful but simple to use. Other features include —

WORKS IN ANY SCREEN MODE
DISASSEMBLER & ASSEMBLER
FULL STATUS SHOWS REGISTERS, STACK etc.
UP TO 8 BREAKPOINTS
SINGLE STEPS THROUGH ANY ROM
BUILT IN HELP MENU
SPECIAL MODE FOR DEBUGGING GRAPHICS PROGRAMS

Supplied with simple to understand fitting instructions and spiral bound manual. £28 plus £1 p&p plus VAT

#### TERMI

TERMI is a general purpose communications ROM for the BBC micro. It will allow communication between the BBC and practically any other machine with an RS 232 interface. This ROM is not dedicated to emulating a particular terminal but has several modes of operation. It can be used as a slave graphics terminal or, in the custom mode, as a DEC VT52 terminal emulator. It will also act as a dumb terminal. The user is free to swap between 40 and 80 column screen modes even while on-line.

The most powerful feature of this package allows the user to send ASCII files from a BBC disc down the line or to receive files from the RS 232 and to save these on disc. It also allows a copy to be kept on the printer.

TERMI is supplied with a "CUSTOM" program on disc that allows the user to set up his own protocols i.e. line speeds, screen modes, start & stop bits etc., and to have these loaded from the disc every time TERMI is used.

TERMI is an 8K ROM supplied with a manual, fitting instructions and a customisation disc. £28.00 plus £1 p&p plus VAT.



COMMUNICATOR is a single chip that plugs into a normal BBC Micro and turns it into an advanced DEC VT100 terminal emulator. The combined cost of a BBC Micro and this software is considerably less than a new VT100 — and you get all the advantages of one of the best micro computers available. A large range of high quality software is already available for this micro — word processors, spreadsheets etc.

Computer Concepts commissioned Specialist Software Products Ltd. to produce the most advanced emulator possible for the BBC microcomputer, its features include:

- ★ Exceptional XON/XOFF handshaking, even while spooling at speeds of 9600 baud.
- ★ Superb menu driven configuration a great improvement over the real VT100.
- ★ Double height and double width character lines plus two character enhancements.
- ★ Independent windowing for split screen operation.
- ★ VT100 character graphics.
- \* Disc spooling and transmission of ASCII files.
- ★ Application keypad mode including generation of these escape sequences.
- ★ VT52 mode.

Nearly a full V1100, the most notable omission is the 132 character mode — impossible to implement on the BBC Micro.

While COMMUNICATOR can be used for direct communication to a mini or mainframe, it also allows access to the world of electronic mail. This ROM is already widely used with the DAILCOM electronic mail service. Text may be prepared off-line with the BBC machine and transmitted at full speed via a modern when on-line to the system.

COMMUNICATOR is a 16k ROM supplied with a spiral bound manual and clear fitting instructions. £59.00 plus £1 p&p plus VAT.

Both TERMI and COMMUNICATOR may be used for any of the following

Mainframe or mini communication.

DEC VI52 terminal emulation.

British Telecom Gold. (Electronic Mail)

Bulletin boards of most types

DISTEL, REWTEL, MAPTEL etc.

Almost any async. RS232 communication systems.







16 Wayside, Chipperfield, Hertfordshire. WD4 9JJ Telephone: Kings Langley (09277) 69727



#### From Page 164

;" Denary Derrick is a bad spider who "; 1860 \*FX15,1 CHR\$ (134); "must be stopp 1870 VDU 23,0,8202;0;0;0; ed. He is carrying a"

1400 PRINT TAB(0,6); CHR\$ (134) "number with which he :PROCintro will try to land."

1410 PRINT TAB(0,8); CHR\$ (134) 1890 REM "There are two ways 1900 DEF PROCexplode of stopping Derrick:" 1910 AZ=AZ+64

1420 PRINT TAB(5,10); CHR\$ (129 :BX=BX-32 );"(1)";CHR\$ (134);"By 1920 score=score+10 sending up a rocket :SOUND 1,1,30,30 with "; CHR\$ (134); :SOUND 2,1,50,30

as Derrick."

1430 PRINT TAB(9,12); CHR\$ (134 ); "This will help you to get"; TAB(9,13); CHR\$ (134); "used to using 1960 CALL TEAR a key board."

1440 PRINT TAB(5,15); CHR\$ (129 1980 ENDPROC );"(2)";CHR\$ (134);"By sending up a rocket 1490 REM with "TAB(9,16); CHR\$ (134 ); "the number which when added"

1450 PRINT TAB(9,17); CHR\$ (134 ): "to Derrick's makes ten. "TAB(9,18); CHR\$ (134 ); "E.g. If Derrick has

1460 PRINT TAB(9,19); CHR\$ (134 ); "you must use 3 to fire.": TAB(0,21); CHR\$ (134); "To guide the rocket use:"; CHR\$ (131);"( Left"; TAB(25,22); CHR\$ (131); "> Right"

1470 PRINT TAB(0,24); CHR\$ (130 ); "Choose game by pressin g key 1 or 2."

1770 REM

1780 DEF PROCanother

1790 67=67+1

1800 PRINT TAB(10,6); CHR\$ (131 ); "END OF GAME: "; 6%

1810 PRINT TAB(9,7); CHR\$ (130) : "========="

1820 PRINT TAB(9,10); CHR\$ (134 ): "Your score was: ";score

1830 H%=H%+score

1840 PRINT TAB(9,12); CHR\$ (134 ); "Your total is : "; H%

1850 PRINT TAB(10,15); CHR\$ (130); "PRESS ANY KEY"

: Z\$=GET\$

:CLS

1980 ENDPROC

the same number 1930 FOR D%=0TO 20

1940 DRAW RND (400) -200+A7 RND (400) -150+8%

1950 VDU 224+RND(10) :6COL 0,RND(15)

1970 NEXT DX

1480 ENDPROC

1500 DEF PROCinit

1510 BZ=1024

:A%=RND (900)+100 :COL%=8

:CHX=RND(20)-10

1520 NIX=NX :REPEAT

: N%=RND (9)

:UNTIL NXONIX

1530 IF A\$="1" KEYX=NX+48

1540 IF A\$="2" KEY%=58-N%

1550 2470=0

1560 VDU 19,0,4,0,0,0,19 ,4,0,0,0,0,0,19,14,1 ,0,0,0,0,19,13,2,0,0 .0,0

1570 VDU 28,0,31,19,29,17 ,142,17,13,12,4,10

1580 PRINT \*SCORE : ";score; " BASES :";men

1590 VDU 5

1600 \*FX9,5

1610 \*FX10,5

1620 ENDPROC

1530 REM

1640 DEF PROCupdate

1650 VDU 4,12,10,17,142,17

This listing is included in this month's cassette tape offer. See order form on Page 169.

:PRINT "SEORE : ";score; " BASES :";men : VDU 5 1660 ENDPROC 1670 REM 1680 DEF PROCLand 1690 FOR ZX=0TO 15 : VDU 19, ZZ, 4, 0, 0, 0, 0 :NEXT ZZ 1700 VDU 19,14,1,0,0,0,0 ,19,13,2,0,0,0,0 1710 MOVE 50,600 :6COL 0,13 :PRINT "DERRICK HAS LANDE D. 1720 SOUND 10,0,0,0 :SOUND 1,-10,97,10 :SOUND 1,-10,105,10 :SOUND 1,-10,89,10 :SOUND 1,-10,41,10 :SOUND 1,-10,69,20 1730 men=men-1 1740 FOR WT=0TO 10000 : NEXT 1750 FOR Z%=0TO 15 : VDU 19, Z7, Z7, 0, 0, 0 ,0



# 

7 COLOUR INK JET PRINTER

Logic seeking in dot address mode £499 + VAT

With Centronics parallel interface and free BBC Micro dump listing.

#### Options available:

- Buffered RS232 interface.
- Viewdata & RS232 interface.
- Apple II interface.
- IBM PC dump.

Specifications:

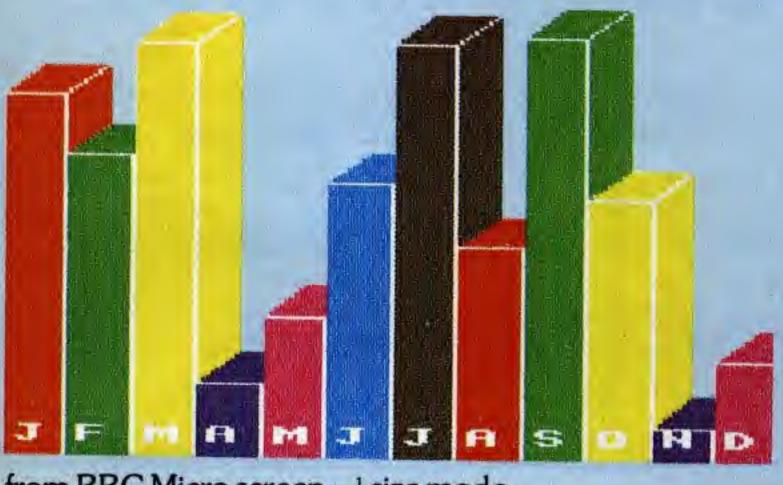
640 dots/line.

84 dots/inch both axes.

Friction feed rollpaper with single sheet feed A4.

37cps in full colour.

Ink cartridges, 4 million character life.



from BBC Micro screen - ½ size mode



Church Gresley, Burton-on-Trent, Staffs DE11 9PT Tel: 0283 215432 Telex: 377106

Dealers. OEM & Educational enquiries welcome

# THE MICRO USER

A subscription will ensure you get your own personal copy HOT OFF THE PRESSES month after month for the next year.

# Be one of the first to get each issue!

Every owner of a BBC Micro – and everyone thinking of buying one – needs to get Micro User every month. It's the biggest, brightest, most authoritative yet completely independent guide to a machine that has so much potential you will never tire of reading about its remarkable capabilities.

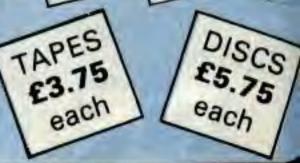
You can buy Micro User from your local newsagent or station bookstall. Or you can take out a 12 months subscription and have it delivered by post.





#### Cassette tapes and discs of Micro User programs

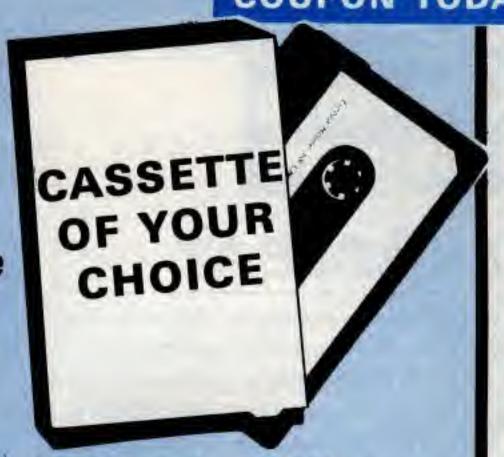
Take out a year's subscription and have your cassette or disc posted to you each month. You can start your subscription from any issue to take advantage of this offer. Order on the coupon opposite.



COMPLETE THIS **COUPON TODAY** 

All prices include postage, packing and VAT, and are valid to March 30, 1984

Cassette worth £3.75 if you subscribe NOW!



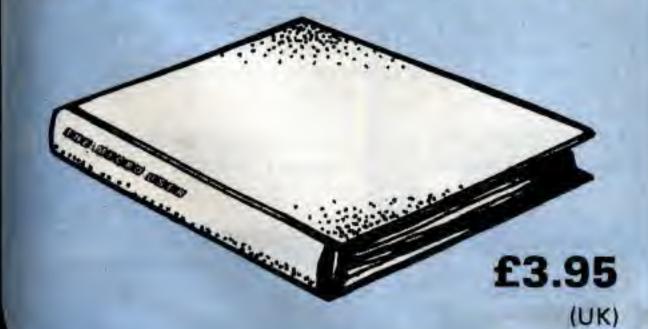
If you take out a subscription to Micro User you will receive completely free one of the monthly cassettes of Micro User listings. Choose which one you want from those illustrated below. This free gift is for a limited period, so subscribe now!

#### Your BBC Micro needs protecting!



£3.95

Keep your collection of Micro User complete with these handsome binders



Pl	required in box £ p
1	required in box L p
Micro User	UK £14.50
	RE £15 (IR £18)
Surface mail – Re	est of world £20 est of world £65
Selected free cassette	Control of the contro
Commence with	The state of the s
Micro User	Control Control
	March 1983 April 1983
back issues	May 1983 June 1983
£1.50 UK Rest of world:	July 1983
£1.75 - Surface	Aug 1983 Sept 1983
Airmail prices on application.	Oct 1983
The state of the s	Nov 1983 Dec 1983
	Jan 1984
	Feb 1984 TOTAL
Annual subscription	£40-Tape £60 - Disc
for tapes and discs*	(UK & Overseas)
Commence with(st	ate month) TOTAL
Single copies of Deathwate	h Mar 1983
King Kon	g April 1983
Air Strik	The state of the s
£3.75 - Tape Tenpi	n Jul 1983
£5.75 - Disc Fruitie (UK & Overseas) Robin & Maria	- Flog 1000
*Please indicate which Blackjack / Goblins	Oct 1983
DFS and disc Tower Bridge	e Dec 1983
format you require Barrel Battle Acorn 40 track Alien Invasion	The second secon
Amcom 80 track Mazemunci	
Watford Other	
- Transier	TOTAL
Dust Covers	
£3.95 - Deluxe	
(UK & Overseas)	TOTAL
	TOTAL
Binders	
£3.95 - UK	
£5.00 - Overseas	
	TOTAL
Payment: please indicate method (	/) TOTAL
Access/Mastercharge/Eurocard	
Barclaycard/Visa	
American Express	MasterCord
Card No.	
Expiry Date	TON TON
Cheque/PO made payable to Datab	ase Publications Ltd.
Name	
Address	
Address	
Signed	
Send to: Micro User, FREE 68 Chester Road, Hazel Grov	POST, Europa House,
(No stamp needed if posted in UK)	
You can also order by	The second secon
Any of the goods listed here can be o	ordered by telephone. Micronet

Telephone:

061-480 0171

her users of Prestel can also use the Prestel Mailbox.

**Prestel Mailbox** 

614568383



#### SITUATIONS AVAILABLE AT

IMAGINE SOFTWARE LTD is the largest and most successful game software house outside of the U.S.A. with more than 100 staff occupying 19,000 square feet of premises throughout Liverpool. Imagine Software are at the forefront of todays exciting software industry. As a result of Imagines' advanced and imaginative expansion program the following positions have become available. In all cases renumeration is commensurate with ability and seniority and is above industry standards. In many cases a new car and numerous fringe benefits will be part of the package. Relocation assistance will be given to successful candidates wherever needed.

#### SENIOR SOFTWARE MANAGER

A position exists for a Senior Manager who will be responsible for several departments working in diverse areas of software design and production. Applicants must have proven experience in commercially orientated software environments and a wide range of technical knowledge and skills.

This is a very senior position with many exciting and rewarding aspects. Career prospects are excellent.

#### SOFTWARE MANAGERS

Two positions exist to manage large software departments at the forefront of the games industry.

Applicants must have a proven knowledge and interest in computer games. A wide range of software skills and experience in managing programming staff.

#### SOFTWARE ARTISTS/GAMES PROGRAMMERS

Eight positions are available for programmers with both the technical ability and the creative skills needed to invent and code best selling games.

Fluency in at least one assembly language, artistic ability plus proven experience are the necessary qualifications. The successful applicants will be working in an innovative environment with the best available development software and equipment and will be provided with a high level of technical back up. This is the ultimate career opening for games programmers.

#### SYSTEMS SOFTWARE PROGRAMMERS

Two positions exist for systems software programmers working on very advanced products. Both positions are exciting and innovative. For the first, applicants must be fluent in the 'C' language and MCS68000 assembler and be familiar with Unix type operating systems.

Applicants must be able to demonstrate a wide knowledge of advanced development tools.

The second position requires a fluency in pascal and MCS68000 assembler and familiarity with the UCSD operating system. Experience of computer graphics and general business orientated applications software will be an advantage.

#### **PROGRAMMERS**

Thirty positions exist for programmers working in a team environment on many diverse aspects of microcomputer software, including the conversion and adaption of games to new microcomputers.

Applicants should be fluent in at least, one assembly language and have great familiarity with at least one currently popular consumer microcomputer. Experience is not necessary but provable ability is a qualifying factor.

#### **GRAPHICS PROGRAMMERS**

Two positions are available for programmers with skills, experience and knowledge of microcomputer graphics as applied to games software.

Applicants must be fluent in at least one popular microcomputer assembly language and preferably have a working knowledge of one other, plus familiarity with currently available microcomputer capability. Provable experience and/or ability essential.

#### **COMPUTER MUSICIANS**

Two openings are available for programmers who have the ability to write music and sound effects for popular micros. The applicants must have a good knowledge of an assembly language and proven musical skills.

#### **GAME DESIGNERS**

Two positions exist for game designers to design a wide variety of entertainment software. Applicants will have both experience in general games design and theory plus a working knowledge of microcomputers.

#### **TECHNICAL WRITER**

An opening exists for a technical writer to prepare software manuals for both commercial products and internal development tools.

A recognised writing qualification will be necessary for applicants as will a very wide working knowledge of microcomputers.

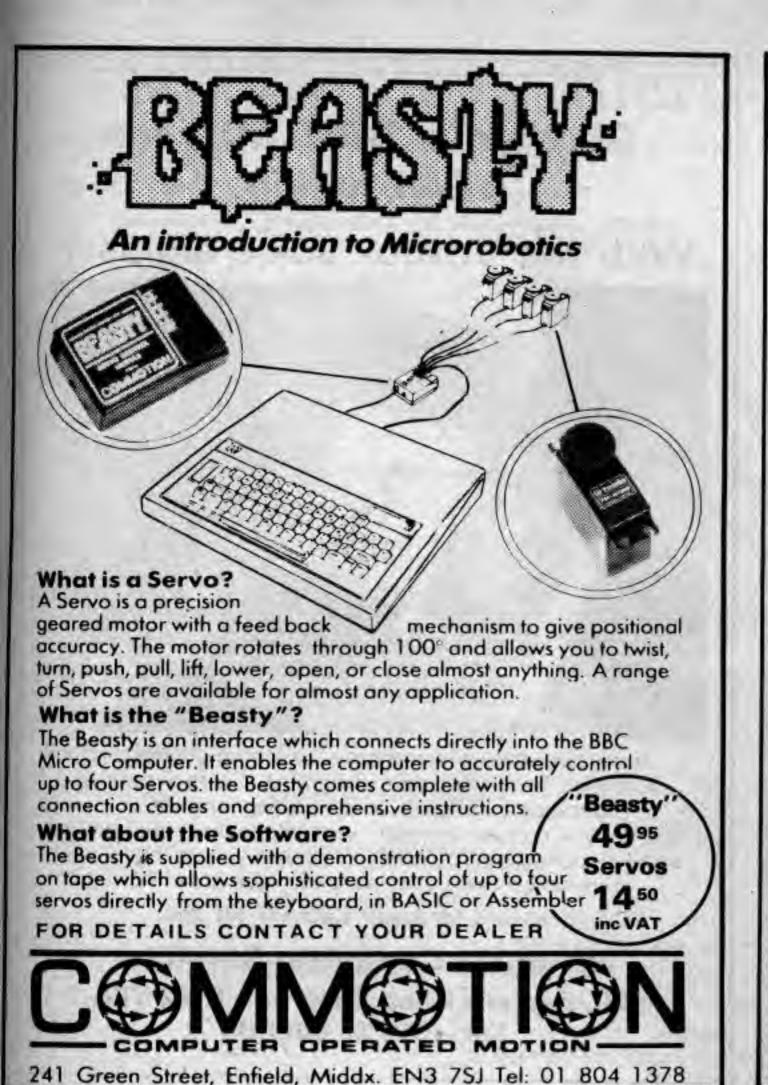
#### **GRAPHIC ARTISTS**

There are six positions available for artists working on games design and production using computer based graphic tools.

A knowledge of microcomputer graphics plus excellent artistic skills are the qualifications for these positions.

Applicants should in the first instance send thier C.V. to:
PERSONNEL DEPARTMENT, IMAGINE SOFTWARE LIMITED

IMAGINE HOUSE, 5 SIR THOMAS STREET, LIVERPOOL L1 6BW or ring for an application form:— 051-236 8100 (20 lines)



#### EDUCATIONAL SOFTWARE -**BBC MODEL B**

SKULIST... MAKE LISTS OF STUDENTS IN YOUR SCHOOL, DISC OR TAPE

SKULIST is used to input student register number, name, address, telephone numbers, sex, date of birth, form and house number (etc). Data may be sorted, entered deleted, changed and browsed. Automatic form number changes at the beginning of each school year. May be saved and loaded to tape or disc. Data may be listed to printer in a variety of formats. Students may input their own data to teach keyboard skills, screen reading and provide useful lists for school administration staff.

Program may be customised with your school name. Up to 100 entries per file may be entered. Number of files limited only by disc or tape size. Comprehensive instructions provided. Send cheque or P.O. for £7.90-Tape or £8.90-Disc (incl. p&p). Allow 14 days for delivery. Indicate Tape □; Disc □; 40 track □; 80 track □; Printer Serial □; Parallel □

#### MULTIPLE CHOICE EXAMINATION QUESTIONNAIRE, BBC MODEL B. TAPE OR DISC

The TEACHER may input up to 60 multiple choice questions per file and save the question files on disc or tape. The question files may then be loaded by the STUDENT and answered. The time taken and the number of correct and incorrect answers is recorded by the programme. The question files may be printed, edited, deleted and rearranged. This program removes the need to mark OBJECTIVE QUESTIONNAIRES. The program does it for you. Full instructions provided. Send cheque or P.O. for £8.40-Tape or £9.70-Disc (incl. p&p). Allow 14 days for delivery. Indicate Tape □; Disc □; 40 track □; 80 track □; Printer Serial □; Parallel □

GRAPHICS DESIGN PACKAGE. BBC MODEL B. DISC ONLY

THE DESIGNER allows freehand drawing on the scren using the keyboard but without the need for a joystick.

Features include: drawing in 4 colours, filling of any shape, drawing of boxes, triangles, circles, elipses etc. Screen window movement, rotation and mirror imaging are standard. Sets of commands may be stored as macros for easy reproduction of similar images. Text may be combined with graphics and editing is simple. Images may be stored on disc and accessed by user written programs without the need to know BBC graphics. Useful for quickly drawing titles. attractive program instructions and explanatory diagrams etc. Any standard disc configuration is acceptable. Only one disc drive is necessary. Full instructions provided. Send cheque or P.O. for £9.95 (incl. p&p). Allow 14 days for delivery. Indicate 40 track □ or 80 track □

TAPELIB . . . TAPE LIBRARY PROGRAMME. BBC MODEL B. TAPE OR DISC

With TAPELIB details of up to 250 programs may be stored in memory. Data may be entered, edited, deleted, sorted, saved loaded and printed. Editing is made easy by use of the browse facility. Tape names and tape sides can be swopped when the tape name changes. Full instructions are provided. Send cheque or P.O. for £7.50-Tape or £8.80-Disc (incl. p&p). Indicate Tape □; Disc □; 40 track □; 80 track □; Printer, Serial □; Parallel □. Allow 14 days delivery.

JONSOFT

Baitings Mill, Norden, Rochdale OL12 7TQ, Lancashire.

A Full One Year Warranty offered on all the products we sell. Full Pre/Post Sales Support.





#### **EPSON RX80**

- 100 CPS 9 x 9 matrix
- True descenders
- Bit image graphics
- 11 character sets
- Very reliable

RX80T £219.95 RX80F/T £239.95 FREE Screen dump (Cassette)

#### STAR GEMINI 10X

- 120 caps 9 x 9 matrix
- User defined ch'rs
- Friction/Tractor and roll holder
- Macro instructions

10X £198.95 15X £315.00 • Free Hi-Res. cassette

#### COPY ALL DISK

- Copies ALL protected disks inc. tape to disk utilities.
- So good it even copies itself
- Simple to use
- Includes sector editor

Copy All £10.50

#### **ORDERING** INFORMATION

- · Orders received before 3pmsame day despatch
- Government, Educational orders welcome
- Credit Cards—just ring your order through

Carriage printers/monitors

24hr Delivery OTHER-50p (1st Post)

Please add 15% VAT

#### **ACCESSORIES**

£32.00 WORDWISE "The" Word Processor

Printer Cable £10.99

BASF SS S/D Disks £10.99 (Box 10)

Paper (2000 shts) £12.00 +

£3.00 carriage)

#### **EPSON FX80**

- 160 CPS 9 x 9 matrix
- Proportional spacing Downloadable ch'rs
- 2K Ram Buffer

FX80 £329.95 FX100 £434.00

FREE Hi-Res. cassette

#### **BROTHER HR15**

- 18 caps
   3K Buffer
- Proportional Spacing
- 2 Colour Print

HR15 £369 £199 Sheet Feeder Tractor Feed £75

#### MONITORS FIDELITY CM14"

- RGB RGBY
- Composite video
- · Works with all micros & VCR's £169.95

CM14

PHILIPS 2" Green

80 Column & Graphics

P80 £74.95

UNIT 25, 2 RAILWAY STREET, HUDDERSFIELD HD1 1JP TEL. HUDDERSFIELD (0484) 687928

# BBC MICRO CONSOLES "As supplied to BBC, Universities, Colleges, Schools etc."

Not just a monitor/tv stand but an expansion console which gives your micro the professional look. Protects and encloses your micro with room for disc drives and 2nd. processor or teletext adapter etc., all untidy connecting wires safely out of sight within the console. Made of light yet strong aluminium with a textured finish in matching BBC colour. Available now a bolt on extra module to the console for further expansion options. YES this console will grow with your needs. Basic BBC console as shown £39.99 + £4 carriage\*

After 31st March console price is £44.99.



expansion module only £14.99 + £2 p&p

"Matching printer stand available yes stick your paper under the printer". Only £14.99 + £2 p&p

#### **VDU STANDS FOR ELECTRON & BBC**

Acorn owners who only need a VDU stand will find the stand slips over the micro with adequate ventilation allowed for. After use the micro slips UNDER the stand acting as a dust cover. VDU stand BBC & Electron only £14.99 + £2 p&p



Add VAT @ 15% to all prices

MAIL ORDER ONLY

Viewing by appointment only

For further information or send cheque to:



27 WYCOMBE ROAD, LONDON N17 9XN. TEL: 01-801 3014 (24 Hr Ansaphone)

# Give your BBC Micro a REAL voice.

With the Voxbox voice digitiser.



Normal human voice can now be stored on disc and accessed from your own programs. Store words or phrases in English or any other language.

The Voxbox comes complete with a speaker, microphone and full operating software to enable you to build your own voice files. Just plug into the User Port.

It speaks for itself. £89.00 all inc.

Multiplex Computer Services 250, Eastern Road, Brighton BN2 5TA. Tel: (0273) 606860

#### WALRUS COMPUTER EDUCATION

Don't leave your BBC Micro or Electron on the shelf.

Use it – and a WALRUS home study course – to teach yourself structured programming.

#### STRUCTURED BASIC ON THE BEEB/ELECTRON

- ★ Specially designed for the beginner ★
  - ★ Set out in ten lessons ★
- ★ Includes software cassettes with lots of educational programs ★
  - ★ Assignments for tutor feedback ★
  - ★ Comes in two teaching packs ★
    - ★ Costs only £24 ★

To receive your first teaching pack, send cheque/PO for £24 to:



#### HARDWARE AND SOFTWARE

### Micro-Rid

#### FOR THE BBC MICRO

SOFTWARE - Programs that are guaranteed to run! Save hours of work and worry with these utilities, educational & business programs on cassette or disc.

disc.				Section of the	111111111111111111111111111111111111111	a, sassational a business programs	un casse	tte i
CASHBOOK	Double entry 4 columns with accounts &	tetur		520	BANNER	Print giant text and graphics on paper for	1	
CACURCON		£11.95	В			displays	£2.05	40
	Full disc version. 1200 items on 100k disc	£19.95	В	521	BIGLETR		13.95	A
LEDGER	Complements CASHBOOK with ageing &			0.00	Aradass.	screen dump		44
and the same of		£11.95	В	600	FORTH			A/
MAILING	Holds 218 addresses. Alpha & post code		2.0			Advanced Table Conditioning age HOM	134.74	1
POLICE STATE	sorts, searches, any label format, delete.			001	LUGU-TUNIH	Advanced Turtle Graphics Language ROM		
a shade	add and amend	£11.95	B	602	PACCALT		£57.50	
LC 5/1.0(0.0/5.979	In 2 parts to handle weekly or monthly (state	0	-	002	TAGCAL-1	Structured language ROM with compiler-	Maria .	
(W or M)	which) PAYE & NI for 100 employees, Fully	0.00		603	YCAL		£57.50	
MANAGED IN CO.	supported		R	003	ACAL	Computer Assisted Learning ROM for		
MEMO-CALC	Database/Calcsheet with up to 255		-	605	WORDWICE		£65.00	
	columns, string or numeric data sorts			005	WONDWISE	Superb fast & easy to use wordprocessor		
	searches, calculations	£12 95	0	con			£33.95	
GAMES 1		212.33	D	606	CDUMP	Screen dump, 8 colours, suitable for	ALC: U.S.	
	Mr. Midon	FE OF	D/E	207	America .		£12.95	1
STOCKMARKET		15.55	DIE	607	GDUMP	Screen dump ROM, 8 shades, 8 sizes and		
	players	CE OF	n/r	444	wiewellow	windows	£17.95	
HANGMAN		15.95	B/E	608	DISKDOC	ROM for disk problems in format, search,		
	Italian Spanish	67.05	-	12.00	44400000	files etc.	£27.50	1
DISTANCES		17.95	В	608	GRAPHICS	NEW ROM for Sprites, LOGO, circles,	200	
DIGITALIDED	WORLD Calculate the distance between					fill etc.	£27.50	1
	any 2 places	20.22	(4).0			Various titles for the BBC Micro from		
FLAGS		14.95	B/E			C15 Computer quality tapes packed in 10's	£4.50	
TENGO	so full colour riags of the world with	22.55	3775	810	5.25" DISCS	MEMOREX: SS/SD 40/80T		
STATDACK			B/E					
	Statistics package giving over 30 results	£9.95	В	900	SEIKOSHA	GP700A 7 COLOUR 30 shade dot matrix	220.00	
GNAFA		24.515				printer 50cps	£389.00	
EDENICH		£7.95	В	901	EPSON RX-80 T/F		2003.00	
FRENCH	New audio visual computer way to learn a					The state of the s	£275 00	
CALLED TO THE REAL	language	£7.95	В	902	EPSON FX-80		12/5.00	
SPELL-CHECK	Add to WORDWISE, 15000 words in 12		-			F/T Roll	C36E 00	
	The state of the s	£17.95	p	910	DISC DRIVES		1305.00	
PROCAID		217.30				Format disc cable and excellent manual		
	program and alter it. PROCVAR to list					From	*****	
	variables in a BASIC program &			915	DISCUPERADE		1189.00	
	PROCELUSH to clear resident integers in			-	DIOC OF GITABLE	eveters	*****	
	DALL	FOAE	A / D	920	VDU STAND		1//.50	
UTILITY-A		13.45	A/B			12" Grand Manager Support protects your micro	of 19.95	
200	DEFCHR to design & display graphic			550	GILLEN VDO		200 20	
	characters SORTM/C a very fact machine			931	COLOUR VOU			
	code numeric sort SOPTRAS the					16 his second reprote	£179.95	
	transference and force or make many		4 /10	000	OAT-TO MED			
	and spoted lastest by sic sort foutine	15.95	A/B			computer from	£570.00	
	CASHBOOK LEDGER MAILING  PAYROLL (W or M)  MEMO-CALC  GAMES 1  STOCKMARKET  HANGMAN  DISTANCES  FLAGS  STATPACK GRAPH  FRENCH  SPELL-CHECK	CASHBOOK CASHBOOK LEDGER Complements CASHBOOK with ageing & analysis MAILING Full disc version. 1200 items on 100k disc Complements CASHBOOK with ageing & analysis MAILING Holds 218 addresses. Alpha & post code sorts, searches, any label format, delete, add and amend In 2 parts to handle weekly or monthly (stat which) PAYE & Ni for 100 employees. Fully supported Database/Calcsheet with up to 255 columns, string or numeric data, sorts, searches, calculations.  GAMES 1 STOCKMARKET HANGMAN DISTANCES Word game in English, French, German, Italian, Spanish Three graphic maps of U.K., EUROPE & the WORLD. Calculate the distance between any 2 places 98 full colour flags of the world with questions STATPACK GRAPH FRENCH New audio visual computer way to learn a language SPELL-CHECK Add to WORDWISE. 15000 words in 12 dictionaries includes SEARCHBAS to search a BASIC program and alter it, PROCVAR to list variables in a BASIC program & PROCFLUSH to clear resident integers in RAM UTILITY-A  UTILITY-A  Our best selling tape includes PROCAID, DEFCHR to design & display graphic characters, SORTM/C a very fast machine code numeric sort, SORTBAS the	CASHBOOK CASHBOOK LEDGER CASHBOOK LEDGER Complements CASHBOOK with ageing & analysis MAILING Holds 218 addresses. Alpha & post code sorts, searches, any label format, delete. add and amend In 2 parts to handle weekly or monthly (state which) PAYE & NI for 100 employees. Fully supported Database/Calcsheet with up to 255 columns, string or numeric data, sorts, searches, calculations.  GAMES 1 STOCKMARKET HANGMAN DISTANCES FLAGS Samphic maps of U.K., EUROPE & the WORLD. Calculate the distance between any 2 places SB full colour flags of the world with questions STATPACK GRAPH FRENCH STOCKHECK Add to WORDWISE. 15000 words in 12 dictionaries includes SEARCHBAS to search a BASIC program and alter it, PROCVAR to list variables in a BASIC program & PROCFLUSH to clear resident integers in RAM  UTILITY-A  Dur best selling tape includes PROCAID, DEFCHR to design & display graphic characters, SORTM/C a very fast machine code numeric sort, SORTBAS the	CASHBOOK  CASHBOOK CASHBOOK LEDGER COMPLETED STATPACK GRAPH PROCAID  FELL-CHECK CASHBOOK LEDGER  COMPLETED STATPACK GRAPH CASHBOOK COMPLETED STATPACK CASHBOOK CASHBOOK CASHBOOK COMPLETED STATPACK COMPLETED STATPACK CASHBOOK CASHBOOK CASHBOOK COMPLETED STATPACK COMPLETED STATPACK CASHBOOK CASHBOOK CASHBOOK COMPLETED STATPACK CASHBOOK CASHBOOK CASHBOOK CASHBOOK CASHBOOK COMPLETED STATPACK CASHBOOK COMPLETED STATPACK CASHBOOK COMPLETED STATPACK CASHBOOK COMPLETED STATPACK CASHBOOK CASHBOOK COMPLETED STATPACK COMPLETED STATPACK COMPLETED STATPACK CASHBOOK CASHBOOK COMPLETED STATPACK C	CASHBOOK  CASHBOOK  CASHBOOK  LEDGER  CASHBOOK  LEDGER  Full disc version. 1200 items on 100k disc Complements CASHBOOK with ageing & f11.95 B 600  MAILING  MAILING  Holds 218 addresses. Alpha & post code sorts, searches, any label format, delete, add and amend f1.2 parts to handle weekly or monthly (state which) PAYE & NI for 100 employees. Fully supported f1.2 parts to handle weekly or monthly (state which) PAYE & NI for 100 employees. Fully supported f2.4.95 B 605  GAMES 1  STOCKMARKET  HANGMAN  DISTANCES  Three graphic maps of U.K., Funch, German, Italian, Spanish  Three graphic maps of U.K., EUROPE & the WORLD. Calculate the distance between any 2 places STATPACK GRAPH  FRENCH  SPELL-CHECK  Add to WORDWISE. 15000 words in 12 dictionaries roll anguage  THOM SEARCH SEARCHBAS to search a BASIC program and alter it. PROCVAR to list variables in a BASIC program & F3.45 A/B 920  UTILITY-A  Dur best selling tape includes PROCAID. DEFCHR to design & display graphic characters, SORTMAC a very fast machine code numeric sort, SORTBAS the	CASHBOOK CASHBOOK CASHBOOK LEDGER COMplements CASHBOOK with ageing & analysis Analysis Analysis COMPLET COMPLE	CASHBOOK  CASHBOOK CASHBOOK CASHBOOK CASHBOOK LEDGER  CASHBOOK LEDGER  CASHBOOK CASHBOOK CASHBOOK CASHBOOK CASHBOOK CASHBOOK COMplements CASHBOOK with ageing & analysis Analy	CASHBOOK CAS

ADD VAT TO ALL PRICES EXCEPT BOOKS.

ADD £1.75 FOR PROGRAMS ON 40 OR 80 TRACK DISC. NO POST CHARGE IN UK. MOST PROGRAMS AVAILABLE ON MICRONET 800.

Send for our free brochure for more information before parting with your money.

Micro-Aid (MU)

25 Fore Street, Praze, Camborne, Cornwall TR14 0JX Tel: 0209-831274

# CORTEX computers

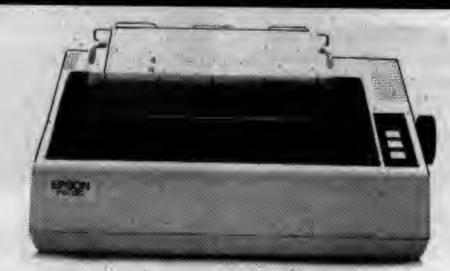
AT RYMAN, 1st FLOOR 6-10 GT. PORTLAND ST. LONDON W1 TEL: 01-631 0464



The outstanding value for money daisywheel printer. Superb quality print, proportional, 10 or 12 pitch Adler daisywheels. 18cps bidirectional. Full Diablo protocol. Centronics interface. 2k buffer.

#### **JUKI EXTRAS**

Daisywheels – send sae for sample print-outs £16.10
Ribbons – multistrike £3.00
Tractor £103.50
Sheet feeder coming soon Cables – for BBC £15.00



EPSON RX80 FT £299 inc VAT

The new inexpensive Epson printer. Many of the features of the FX80, but 100 cps. Enlarged, condensed and italic characters. No proportional characters. Superb graphics. Built in tractor and friction feeds.

#### **EPSON EXTRAS**

Ribbons. Best quality fabric
Cables – for BBC
Serial interfaces for VIC
Internal buffers. 16k, 32k, 64k

Tractor for FX80

All prices include VAT. Postage on Printers £10.

from £99.00 £35.00



The new Epson high speed matrix printer. Friction and 91/2/10 inch pin wheel feeds. Tractor extra. Good quality print including proportional and down-loaded characters. Superb graphics. 160 cps.

☐ Send me your full price list	
Seria The your full price list	
Send me ☐ Juki 6100. ☐ Epsc	on FX80
☐ Epson RX80FT ☐ Other item	ns as
listed. I enclose cheque for £_	
Charge my Access Visa card	No

		_	
Name	all the same		- 76
Address	-		

#### \*\*AIDS 11\*\*

#### PROGRAMMERS UTILITY ROM



An essential tool for all BBC Micro programmers - saves time and tedium in program management. Brings 12 major new functions, with 5 new commands, and a HELP shortlist. Takes no user RAM.

#### \*LLIST

Program listing perusal, using cursor keys to shift back or forth by a page or a line at a time. Single-key entry to Search routines - see opposite.

#### \*LREN

Intelligent Renumber of up to 255 lines of a program; All cross-references updated e.g. GOTOs, GOSUBs.

#### \*LMOVE

Move up to 255 lines to anywhere else in the program, again updating all cross-references.

#### \*LMERGE

Copy up to 255 lines to new locations. Source can be any program in memory. No corss-referencing.

All the above routines check for logical errors and issue speciffic messages, preventing accidental mistakes.

#### ========== \*AIDS entry to main MENU offering the following choices: Printer

Simple 'toggle' copies all \*AIDS output to printer.

#### Disassembler

- Full listing format with data shown in Hex & ASCII;
- Direct disassembly of any sideways ROMs;
- Output can be saved to a file & \*EXEC'd back for editing, relocation & re-assembly.

#### **Memory Editor**

- Display blocks of memory, including other sideways ROMs, in Hex & ASCII.
- Single-key controls to shift back & forth by block or byte;
- Search for byte string defined in Hex or ASCII.
- Overwrite any section Hex or ASCII mode.

#### Search/Replace string

- Search current BASIC program (anywhere in RAM);
- Search string (1-30 chars) can include BASIC keyword tokens & 'wild cards';
- Each occurrence highlighted within whole program line;
- . Options then available include: find next occurrence, \*LLIST program from that point, Replace string by previously defined string (0-30 chars), etc.
- \* Ideal for generating variable/PROC 'where-used' lists;
- \* Program repair makes any 'Bad Program' available for editing.

#### Variable Dump

- Lists the names & contents of all non-array program variables;
- Shows all array dimensions.

#### List Formatter

- \* Lists program (even 'Bad Programs') in clear easy-to-read format:
- Line number displayed in column of its own
- Indenting for FOR & REPEAT loops, and PROC definitions
- Each statement on a new line
- BASIC keywords highlighted on screen, most without wrap-over.

#### Beeper

\* Invokes automatic beep on every key depression; even in WORDWISE.

Suitable for A & B models, with MOS 1.2 BASIC II

Send cheque or P.O. to: Softsmith

S.a.e for more details; Dealer enquiries welcome.

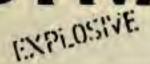
9 Back Green, HERSHAM, Surrey KT12 4HY

compatible. Price, including p&p, & comprehensive 24-page manual:

£21.00

(Upgrade price for Version 1 owners - £12.00)

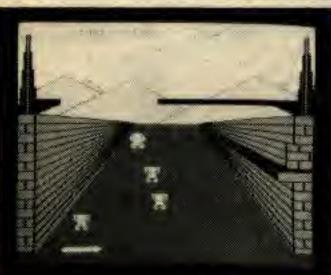
## YNABYIE



Software



### Len, remina Saugrows



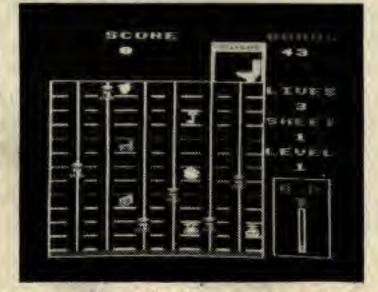
Mad Marco is on the rampage and has blown the bridge to the mainland. The panic-stricken population are hurling themselves into the shark infested waters and your job is to bounce them to safety whilst avoiding the marauding sharks and the desperate attempts of Marco to blow up your liferaft. This highly original, fast and furious game is full of special features and options designed to make your task harder as you get

Machine Code 32k £7.95

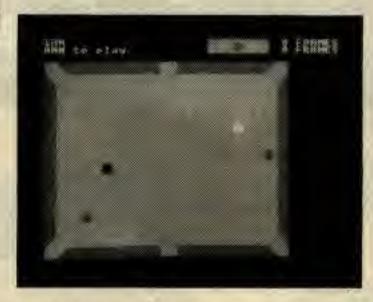
### Corporate Climber New!

Caught in the capitalistic pursuit of corporate expansion, your ambition is to attain the ultimate accolade - the key to the executive washroom! Avoid the eager taxmen in the lifts ready to hinder your climb to power and beware of too much stress resulting in high blood pressure. Definitely not for the faint hearted entrepreneur.

Machine Code 32k £7.95



#### A SUPERB range of QUALITY Programs for the BBC micro



Pool

Classic representation of the real thing incorporating excellent high resolution smooth action graphics for accuracy and making full use of sound. Start practising now and avoid being hustled. You control the cue angle and strength of shot. A real pleasure to play.

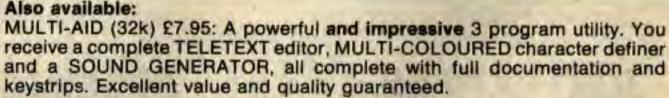
Machine Code 32k £7.95

#### Horserace

An exciting and colourful game complete in every detail with tumbling jockeys, realistic horses, TV van, tote and leader boards, waving crowds and much more. Don't lose your money at the track, try HORSERACE instead. Suitable for 1-6 players.

Basic + M/C 32k £6.95

(All programs require Series 1.0S)



BRAIN TEASERS (32k) £5.95: Six thought provoking games including Reversi, 3D OXO, Mastermind, For42, etc. Superb family fun.

All programs available from most good computer shops or direct from

DYNABYTE SOFTWARE,

31, Topcliffe Mews, Wide Lane, Morley, LS27 8UL. SAE for Catalogue

(Please include 50p p&p)

Trade Enquiries Phone: 0532-535401

# MICROMAIL

# I READ with no little sympathy the letter from Mr Palmer in the January 1984 Micro User in which he complained about the problems of transferring programs from tape to disc.

The simple fact is that software suppliers in this country themselves are responsible for forcing users to resort to criminal extremes to be able to use the software that they have purchased.

The software manufacturers are simply going to have to take a more responsible attitude toward their customers if they hope to survive in an increasingly competitive marketplace.

Consider this: In Cambridge where I live there are at least half a dozen software retailers selling products for the BBC.

In the last two days I have conducted an unofficial survey and I am sorry to have to report that, apart from a few Acornsoft games (about half of their line), I was unable to find a single disc copy of any game for the BBC for sale.

This is the situation that disc-users must face.

You cannot buy a disc copy of software for the BBC and if you buy a cassette copy and upload it to disc (assuming that you are clever enough to figure out how to do it in the first place), you are threatened with prosecution.

It is unfair that Acornsoft have taken the brunt of the

# Time manufacturers gave discs their due

criticism recently over this matter. At least they do manage to distribute a few disc copies of some of their products, which is more than any other software house can say.

Yes, I know that other software manufacturers advertise disc copies, if you are willing to mail-order the product. In addition to having to wait from between one and four weeks to get the disc in the post, in some cases you have to pay an outrageous additional charge of up to £4 for the disc.

An additional charge of £1-£2 is fair for the extra handling and packaging necessary to insure the safety of the discs, but £4 is immoral.

So what are the alternatives? In addition to learning how to transfer most of the software himself, a disc user can buy special products to upload programs for him.

I have a copy of the new and improved version of the most popular of these items, but there are some games (and not only long adventure games) that it still will not handle.

There is still the unresolved legal question of which the user of these items must be aware.

But this is not a long-term solution to the problem.

In the end the only possible solution lies with the software manufacturers, distributors, and retailers.

They are simply going to have to realise that cassette storage is rapidly becoming an obsolete medium, even for the home user.

The change is going to be forced upon them in the next few years whether they like it or not.

Hopefully the more responsible of them will take the initiative by seeing that disc versions of their products are readily available to the purchasers.

Only by doing that will the suppliers have a basis for distinguishing the pirates from the legitimate users who simply want to enjoy the software that they purchased.

In the meantime I have decided not to purchase software from those houses that protect the material to such an extent that it cannot be uploaded to disc without extreme effort.

It is not much, but it is all that I can legally do.

At the moment there are two software houses on my personal "blacklist" and they can rest assured that they will be getting no more money from me.

My only hope is that they go out of business as soon as possible. – D.L. Adams, Cambridge.

## How to save the Sphinx

REGARDING Alice's review of Sphinx Adventure (The Micro User, January 1984, Page 40), it IS possible to save the game during play, although Acornsoft does not tell you how to do it.

To save Sphinx Adventure: When you are ready to save

the game, press Escape.

Enter \*SAVE"SPHINX"

0400 7C00 to save the first part.

Enter \*SAVE"ZERO" 0 90 to save the second part. The game is now saved on tape.

To Reload:

Enter \*LOAD"SPHINX" to

load the first part.

Enter \*LOAD"ZERO" to load the second part.

Enter GOTO 236 to restart the program.

The micro will now display the last location you visited before you saved the program, then it will wait for your next command.

It is important that the two parts should be reloaded as shown above, otherwise certain variables will have the wrong values. – R.W. Crisp, Leeds.

# Improved joystick

I HAVE a tip for all the BBC Micro owners who own the Cambridge joystick – the nonself centering one.

The idea came to me while playing Rocket Raid, and I felt the need for the joystick to go back to the middle after each movement.

All you do is put two thick

elastic bands round the lever. Pull one round the bottom and the other round the cable at the top.

This will affect the joystick so that after any movement it will return to the centre. – Matthew Lemmings, Staines.

# Cherished facility

I WAS very interested to read the letter from David Bye in your December 1983 issue.

If he feels like that about the use of the features of the BBC machine why is he reading your magazine anyway?

He could have bought a cheaper machine which didn't allow him to use procedures, functions and such.

It strikes me that he must not have used one of the machines or he would not have written some of the things that he did.

He says, for instance, that the Acorn compilers were way-wardly silly in using a value of -1 for TRUE and so denying him the facility of writing "IF X and IF NOT X".

If he had tried this he would have found that it would work exactly as it should.

It is true that IF X would be satisfied by any value other than 0, but none of these other values would satisfy the statement IF X = TRUE.

A study of the way in which computers work would have shown that -1 is the only value that could be used for TRUE and still allow FALSE to be zero, as the value of NOTO is -1.

So far as procedures are concerned he says that "the only advantage of PROCs lies in their control variable facility" and that most people don't need this.

I am not sure what he means

# MICROMAIL

#### From Page 175

by this but I know that many people are very glad of a facility which allows them to pass parameters to a subroutine without altering the value of a variable in another part of a program.

Even then I suspect that the major advantage of procedures and functions is their use of

LOCAL variables.

Because of this facility I am gradually building up a library of functions and procedures which I can, after they have been tested, store on disc and call in to any program without needing to know which variable names have been used.

I also know that these procedures will work and that any error must be because I have passed an incorrect value rather than an unsuspected interaction with another part of the program.

An additional advantage of programming in this way is that, if the program needs changing — and it almost certainly will if it does anything useful — it is much easier to see where the changes should be, and what their effect will be.

In 1970 and 1971 I was very much involved with the amendment of computer programs to cope with decimalisation.

Anyone who has had that sort of experience will not need much persuading of the virtues of the modular construction of programs.

All the programs worked but finding out how, so that they could be modified, was a herculanean task.

I have not had my machine long enough to try all the features of BBC Basic but it is my understanding that procedures are, in fact, faster than GOSUBs in large programs as the system records their position.

When I started programming some of the existing programmers looked down on Cobol because "real programmers use assembly languages".

It seems to me that some of this attitude still lingers and it is very much on a par with "good drivers don't need seat belts" and "I know when I have drunk too much to drive".

Mr Bye isn't forced to use the facilities he doesn't like, but I hope that nothing of mine ever depends on one of his programs!

— David H. Wild, Hemel Hempstead.

# Recorded delivery

MOST of us at times find trouble with cassette loading, and I have had some success in overcoming the problem by resorting to my audio equipment.

I have a BBC Model B (OS 1.2) and being very interested in graphics had, among my Christmas presents, a copy of the Acornsoft "Creative Graphics" cassette.

I found that while side A of that cassette loaded without the slightest trouble, side B just would not load at all and produced nothing more interesting than a flood of "Rewind Tape", "Data", etc.

It would seem the copying for side B had not been up to the standard of side A - I can think of no other cause.

So I resorted to my audio method of solving the difficulty as I had successfully done so before, and indeed did on this occasion solve the problem.

I simply place the offending cassette into a cassette recorder and transfer the "sound" from it to a reel to reel machine running at  $7\frac{1}{2}$  ips (19cm), using manual control over recording levels on the reel to reel machine, and so far as I can, ensuring optimum modulation of the reel to reel track recording.

I then reverse the process and transfer the "sound" from the reel to reel machine and re-record it on to a cassette at normal cassette speed.

I do not usually transfer it

back on to its original cassette tape, preferring to retain that recording – warts and all – as a master.

So I use a separate cassette to record the "copy" track, and again I control recording levels manually.

I have usually found that this re-recorded cassette track will load quite satisfactorily into the computer, as indeed it did on this occasion.

So I now have a perfectly usable copy of side 2 of "Creative Graphics" which works well on my computer without any loading problems, and the original master cassette track works beautifully as far as its side 1 is concerned.

Your readers may find this method a useful way out of trouble. A reel to reel machine is not essential – the system works with two cassette machines, but a transfer to reel to reel recording at  $7\frac{1}{2}$  ips is more satisfactory and reliable. – Norman Gill, Wakefield.

#### Hong Kong take away

A LETTER from Mr D.R. Stafford, Camberley House, Surrey was published in your January 1984 issue. Mr Stafford's letter made nonsense of my May 1983 letter to you (published in your August 1983 issue), whereby I was adamant in stating that all BBC Micros, sold in the UK, are manufactured in the UK.

As I am sure you and your readers are aware, the demand level for the BBC Micro continues to be extremely high. As an exceptional action, to balance the demand, approximately 1,000 Hong Kong-assembled machines were imported for sale in the UK. These machines were the exception.

Elsewhere in your January 1984 issue mention was made of the fact that recently purchased machines had Basic I fitted. I hope you can appreciate that the BBC Micro takes a varying amount of time from the kit to the final product, so that at any time BBC Micros offered for sale can represent a range of versions. — Colin Malone, for Head of Merchandising, BBC Enterprises.

# Unconditional surrender

I FEEL compelled to "put my oar in" on the structured v. unstructured debate.

While I do agree that GOTO is essentially a poor instruction, especially it jumping forwards, why write code then slip over it?

This has to be silly and wasteful – I do not agree that GOSUB should be considered in the same class.

Not so long ago I wrote a piece of quite involved code for simulation purposes. During this, it was found that one piece of code would suffice for several different operations provided different entry points were used for each.

In Basic this was simple - a series of GOSUB calls all utilising the same RETURN.

With PROC I cannot, yet, see an easy solution. It would be possible to use a dummy variable to cause a jump over the (temporarily) redundant code, but oops, that's GOTO isn't it?

Actually I do have another suggestion, whether it would work I don't know:

10000 PROCA(...) 10400 GOTO 10600 10506 PROCB(...) 10600 ....

But that wouldn't be popular with the "structuralists" either, would it?

As a final comment, while I agree with Dr E.T. Freshwater of Leeds, (Micro User February 1984), I think that the main thrust of the structuralists is against the unconditional GOTO rather than the conditional.

The latter would seem essen-

tial if branching in programs is to occur at all! - J. Comerford, Leicester.

• Actually you can obtain this sort of an effect by having several different procedure starts defined (that is, DEF PROCs) with only one ENDPROC to finish. The following program should make the point.

10 PROCA 20 PROCB 30 PROCC 40 END 50 DEFPROCA 60 PRINT "NOW IN PROCA" 70 DEFPROCE 80 PRINT "NOW IN PROCB" 90 DEFPROCC 100 PRINT "NOW IN PROCC" 110 PRINT "ENDING THIS CALL\*

#### Lowdown on OSCLI

120 ENDPROC

COULD you please explain OSCLI? The listing I enclose gives my computer's full spec, then a disassembly of the OS routines, which indicates that as per handbook OSCLI vectors through &208.

But the disassembly from &200 does not have a &208 in it - why?

The memory dump of that area shows &208.

The other strange thing is that if I type as a direct command OSWORD or any of the other routines I get "Mistake" as a reply, but when I type in OSCLI I get "No such variable". Why? - G. Coventry, Chippenham,

Wiltshire. • &208 is an area of vector

data. This part of the memory contains numbers which point or vector to another part of the computer where there is mach-

ine code.

The idea is that the bytes around &208 aren't machine

# Capacitor can clear screen

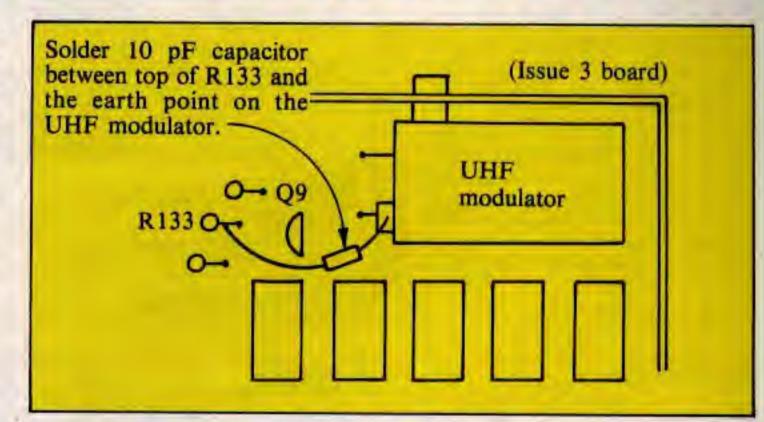
WITH reference to the Micromail letter concerning "drifting lines" that occur across the screen, I would like to say that this is common not only to Sony TVs but to many others used with certain BBC computers.

I have written to Acorn about the problem and according to them it is a fault in the TV.

This is not so, and differing BBC computers suffer the problem to greater or lesser extents - a few, not at all.

The problem is probably either due to beating between the chrominance and luminance signals or between the chrominance and a subharmonic of the CPU crystal oscillator.

Adjusting the trimmer will only offer temporary alleviation and is no real solution.



I have found that for many TVs, Sony included, the set requires only a very small chrominance signal to give good colour, so a simple but effective long term solution is to solder a small 10 pF capacitor across the base of the chrominance output transistor Q9 (across the resistor R133, 120k).

This is very simply done without removing the PCB and without the need for a very steady hand, as shown in the diagram.

It may be easily removed at a later date if required, and will cause no harm to the computer. - Andrew Mackay, Northwood, Middlesex.

code, they just point to the start of something that is, so disassembling them gives nonsense.

In your hex dump &208, contains &89, &209 contains &DF. These locations store the address &DF89, backwards.

When the micro sees JMP(&208), it "decodes" this address from where it is hidden at &208 and &209 and jumps to that address, in this case &DF89.

You might ask why you go round the houses like this - it's usually easier to jump directly to the address with JMP&DF89.

The point is that this way you can fiddle with the address at &208, &209, since they are in RAM (unlike the JMPs at &FFCE onwards).

This way you can make the micro jump to your own routine and to what you want - in other words, you can tailor the machine to your own specifications.

It also allows Acorn to modify things later. If they change the address of a routine in ROM, all they have to do is alter the vector table.

So long as you call through the jump table, as it is known (&FFCE etc), you won't notice a thing.

This means your programs work on both "old" and "new" machines.

As for OSWORD, it isn't a word that the computer recognises, so it says "Mistake".

I know we talk about OSWORDs, but the computer doesn't know it by this name you have to CALL it through the jump table. You can set it up as a variable by using OSWORD = &FFF1.

As for OSCLI, you must have Basic II. This has a word called OSCLI, but it needs values or parameters to go with it.

If you just type OSCLI it looks for them and fails to find them, so says "No such variable", a slightly confusing message.

On Basic I, OSCLI isn't recognised at all and you simply get "Mistake".

#### Tape handling

IN answer to Mr Pentecost's query on tape handling (Micro User, January 1984), if he uses \*FX138,0,13 immediately before each OPENOUT he will not need to type a Return at the keyboard. Details of this call are given on Page 433 of the User Guide.

OPENOUT, OPENIN, OPENUP, CLOSE all effectively call the OSFIND routine at &FFCE. This is described on Page 451/2 of the User Guide.

Astute readers will notice that

# MICROMAIL

#### From Page 177

the value of A on entry produces operations exactly equivalent to Basic II functions.

A=0, Y=? → CLOSE Y

A=&40 → OPENIN (not implemented in Basic I)

A=&80 → OPENOUT

A=&C0 → OPENUP

(OPENIN Basic I)

So to OPENOUT a File called FRED in assembler use:

.openout LDA£138 / bsbyte
number

LDX£0 / Buffer
number (keyboard)

LDY£13 /
Carriage Return

JSR &FFF4 / Call
Osbyte

LDX£ FILENAME MOD
256

LDY£ FILENAME DIV

256 / get address of
filename

LDA£&80
/openout

JSR &FFCE
/Call Osfind

OSBPUT ROUTINE TO FILE

RTS
/ Return to language
(Basic)
.FILENAME

EQUS\*FRED\*+CHR\$13

- Geoff Cox, Gillingham, Kent.

# Fault at line 50

WITH regard to the Beasty Competition (Micro User, February 1984) I have programmed line 30 according to the book, that is 30 PROCpic(0,0,1) but when I attempt to RUN the program the machine indicates Arguments at line 30.

As I only had the system at Christmas I am afraid I do not understand where I am going wrong. - Rodger Gregory, Nottingham.

 Thanks for your letter, especially for giving us the page number and issue. If only everyone were so kind.

Line 30 CALLs a procedure, which is another part of the program. You tell the computer what this part of the program does by defining it – look at line 50.

Now when you call a procedure, you have to hand on values to it — passing parameters. What you're handling on is in the brackets of line 30, separated by commas. These are called arguments.

The computer needs something to receive what has been passed to it. If you look at line 50, you can see three variables, X%, Y%, S, ready to catch what line 30's procedure has passed to it.

The X% receives 0, the Y% gets 0 and S gets 1.

If the number of things your passing doesn't match up, or you try to pass a string to a numeric variable, you get the arguments message for the line you called the procedure from.

The point is, if you've made a mistake on line 50, perhaps missing out a comma, the micro believes this line be the true definition of procedure, so it decides that the line you call it from is at fault.

In this case it says line 30. However, the version you've got in your letter looks correct. Therefore, we think you'll find the fault is at line 50.

And finally, with tongue firmly in cheek . . .

## TILTING AT WINDMILLS...

Dear Trev,

Sorry that I haven't written for so long, but I think I'm going quietly and irrevocably mad. And it's all the fault of Micro User.

They asked me to try out a new game they were thinking of printing called Lancelot and Guinevere. Well I've always fancied that I'd make a good jouster, so I decided that I'd type it in.

As you know, and Andrea keeps telling me, I've been stupid since the day I was born, but since I've had my micro I've been able to prove it.

The first mistake I made (or second, if you count starting the damn thing in the first place) was to turn over two pages at once and start typing in the wrong listing halfway through.

When you think about it I should have realised sooner. After all, it's unlikely that a listing with PROCchivalry and PROC-Merlin and lines like IF virgin THEN PROCunicorn would contain a PROClightpen. As it was, I typed in a whole page before I realised.

Mind you, it wasn't much better when I got back onto the right listing. Do you know the Number of the Beast? Well it's not 666 as you might think, it's line 340. It took me 27 attempts to get that one right, and even now I'm sure that Beeb only accepts it out of

sympathy.

Not that I got much from Andrea. Sympathy, I mean. She couldn't see what all the fuss was about, but eventually, saying she couldn't stand the screaming any longer, she decided to help. And I accepted – my morale and judgement were that low!

A. said that she'd read the listing out to me while I typed it in and it seemed like a good idea at the time. I wiped the tears and sweat off the keyboard (the blood nearly came later) and settled down for what would be positively my last attempt.

And it seemed to work. She dictated and I typed. Then came the moment of truth. I entered RUN and pressed Return (as they say in the beginner's books). I was so nervous that I closed my eyes as the opening tune, "Colonel Bogey", played. I knew disaster had struck when I heard A. ask:

"Should Lancelot be doing that with his lance?"

No he shouldn't. And I had grave doubts that Mark Smirky, the guy who wrote the program, really meant the score table to be round. Against my better judgement I listed the program. It was rubbish.

"What have you done?" I screamed at A., my fingers curling menacingly around the User Guide. "You were supposed to be reading it all out".

"Well, I only corrected the punctuation", she screamed as she beat a hasty retreat, leaving me with my loathsome listing and a near coronary.

Still that wasn't the worst. The worst was my nasty nephew Nigel who just "happened" to call round. I suspect A., but can't prove it. The little horror has an Electron (which explains the "If it doesn't use Mode 7, it isn't worth doing" sticker on my Beeb).

Of course A. told him of my predicament and he offered to help. In my less paranoid moments I've little doubt that it was all done in a spirit of charity, but I did object to his groaning and laughing as he sorted it out. I particularly objected to the way he kept muttering "Dim, dim" under his breath.

Eventually the little horror had it working and he left, but not before he'd had a word with A. I was listening from the top of the stairs and distinctly heard the phrases "at his age" and "ZX81".

And now I have a working version of Lancelot and Guinevere and the challenge seems to have gone out of life. I haven't even bothered to play the game.

Who was it said "it is better to travel than to arrive"? He'd obviously typed in a few listings in his time.

Yours in adversity,

Bob



## PAEAN systems

PROGRAMS FOR BBC MODEL B



Drive yourself mad around this maze adventure. You will have to stay pretty cool to avoid trouble, cope with a myriad of hazards, not to mention a bolshy mate, and get your deliveries right, all at the same time. The Law is never far behind ... so watch out!

Full scoreboard. Optional sound. Keyboard.



An original card based game of great subtlety. The idea is to place 25 of your 26 cards in positions which equal or are greater than the value of the computer's cards. Excellent graphics include clues about the suits and values of the computer's hidden hand - you must be very shrewd to win the maximum 40 tricks. Keyboard.



LIGHT CYCLES

A fast reaction game for the fleet of hand and mind. Can you surround the enemy with your light trace and make them crash? The better you are, the more cunning and numerous the enemy become. Simple and infuriating. Full scoreboard and sound. Keyboard.

Quebec Marketing MU, Little Bealings, Woodbridge, Suffolk IP13 6LT. Tel: Ipswich (0473) 623757

NEW

TELEWRITER

Mode 7 Text/Graphics Manipulator

UTILITY

TELEWRITER

Teleflip

A suite of programs comprising Telewriter -Main editor -Displays up to 20

pages of data Teleload -Allows inserts to other programs

Demo\_Ten -Demonstrates 10 pages of data to play with

This is a powerful utility which gives the serious user easy domination over the BBC's extensive Mode 7 capabilities. Comprehensive manual.

NEW

SLIDER

Synchronises a film slide projector with a taped commentary

UTILITY

SLIDER

£8.50

This utility synchronises a single slide film projector with a pre-recorded tape commentary or music background. A slide projector with remote control is required. Programs allows up to 999 slides to be controlled for variable display times. Applications for lecturers, photographers, architects etc. and micro film users. Instruction manual.

£9.95

#### All prices are full inclusive

AVAILABLE AT GOOD COMPUTER STORES OR DIRECT FROM PEAN SYSTEMS

PAEAN are hunting for high quality, imaginative and exciting programs for the BBC or ELECTRON micro's to market in the UK and overseas. If you have written an original game, educational or beginners program which you believe has commercial potential send a cassette to PAEAN systems and if we agree with you we will offer you a contract. Dont forget to include your name, addres and telephone number.

Still to be won: a £50 note for the first response which correctly interprets the written significance of the PAEAN logo.

**BBC Model B** (any OS, Basic I/II)

## QUAL-SOFT (inc. VAT and p.p.) "LEAGUE DIVISION ONE"

#### THE THINKING FAN'S SOCCER GAME

Are you a soccer supporter? How much do you REALLY know about the game? Can you take a side, newly promoted to Division 1, and build it into a genuine contender for the 1st Division Championship? Can you select the right tactics and team to hold Liverpool at Anfield, and the right ones to improve your goal difference at home to Wolves? Can you "read" a match well enough to see your own team's weaknesses, and then have you the skill to exploit the transfer market to cure them? In short: Would you make a successful 1st Division team manager?

#### WELL HERE'S YOUR CHANCE TO PROVE IT!

- \* You have 5 seasons, 42 League matches/season.
- \* Opposition: 21 of the 22 current 1st Division sides.
- \* Each team has its own playing style and strengths.
- Each team has home and away match tactics.
- \* Define your own tactics. Tactics really work because:-
- \* A true 90 min. match simulation, (3½ min. on your Beeb).
- \* Graphics representation: How the match goes.
- \* Realistic scoring, injuries, red and yellow cards.
- \* Substitution and team adjustments for injuries.
- \* Tactical substitution with repositioning of players.
- \* Transfer market, real (devious) price bargaining.
- \* League position, playing record updated after each match.

NAME: .....

- \* 25 to 30 hours for a game unless relegated.
- \* Simple, quick SAVE/LOAD game facility.

#### CAN YOU GET YOUR TEAM'S NAME ON THE SILVERWARE?

QUAL-SOFT

Dept. CES 18, Hazelmere Rd., Stevenage, Herts. Tel: (0438) 721936 Please send me ...... copie(s) of

LEAGUE DIVISION ONE. I enclose cheque/postal order to the

value of £ ..... or debit

my Access/American Express Card No. ..... ADDRESS: ..... 

SIGNATURE .....

## S Leigh Computer Systems

COMPUTERS	20000	EPROMS	
Sinclair 16K	£86.90	Sideways ROM	
Sinclair 48K	£113.00	Board	£38.00
Dragon 32K	£145.00	2764's (eacl	h) P.O.A.
Oric 48K	£113.00	THE PROPERTY OF SHAPE	h) £15.50
	1 25 OLD PERCONS		11/ 1 15.50
Electron	£173.80	8271's P.O.A.	Same and the
BBC'B'	£346.95	(discount o	n volume)
		MONITORS	
			deb load)
PRINTERS		(all complete w	
	£51.00	Cabel 14" colour	£190.00
Alphacom 30		Microvitec 14"	
Epsom RX80	£225.00	colour	£197.00
Epson RX80FT	£260.00	TV Monitor	£207
Epson FX80	£335.00	T T INTOTITION	220,
Shinwa CP80	£225.00	ACCESSORIES	S
Star Gemini 10	£219	Disc Interface	£78.50
		Upgrade A — B	£57.00
Star Delta 10	£325		137.00
Printer Cable	£8.50	Spectrum	
		16K — 48K	£19.95
Service and the service	Survey Land	Joysticks	977000
<b>CUMANA DIS</b>	C DRIVES	(analogue)	£15.00
Single 100K	£195.00	Joysticks	
Twin 200K	£326.00		CIREO
IWIII ZOOK	1320.00	(self-centring)	£16.50

# LARGE SELECTION OF SOFTWARE - TOO MANY TO LIST £1.25 off 2 pro-rata for over 2

SAE for lists - state machine

ADD 80p carriage – small items £7.00 carriage – large items. ADD 15% VAT to total

36 Derby Road, Hinckley, Leicestershire LE10 1QF. Telephone: 0455 612139

#### A QUALITY LIGHT PEN for the BBC Micro

Absolutely insensitive to ambient lighting.

★ Responds to different colours and screen intensities without any adjustment of TV or monitor.

\* Red LED readout showing that data is available.

★ Switch for program control (allows pen to approach the screen without erroneous data capture)



★ User routines provided on tape and printout

\* 'Freehand' drawing program

 'Library menu' drawing program (define your own library of shapes)

\* Example programs illustrating uses of the pen and its features

#### £25

inclusive

Also available for VIC-20 and DRAGON microcomputers please state your computer type when ordering.

Send cheque or P.O. for £25 to:

Dept. MU1, Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants.

Please enclose SAE if requesting literature

Now also available from good dealers.

Datapen Microtechnology Limited

# Silverlind

SILVERLIND LTD. 156 Newton Road, Burton-on-Trent Staffs, DE 15 OTR, Tel (0283) 63987

TOWNTEST

A very useful aid for teaching Geography in primary schools, this program tests pupils' knowledge of the locations of major towns and cities in England, Scotland and Wales. Well presented, with a high-resolution map.

BIOLOGY
A suite of programs using text, animated diagrams, examples, and questions to assist in the understanding of Biology to CSE, 'O' and 'A' Level standards. Most suited to individual use by students, these programs also contain material teachers can extract for classroom demonstration. Topics covered include the Eye, Ear, Heart, Blood and Circulation, Skeleton, Female reproduction, Genetics, Biochemistry and the Central Nervous System.

A suite of 4 highly motivating programs for the 8 - 14 age range: tables, simple equations, polygons and areas. The programs combine explanation with tests and make good use of colour and sound.

MASTER DIET PLANNER 48K Spectrum
The ultimate in diet programs, the MASTER DIET PLANNER contains details of calories, protein, vitamins and other nutrients for 681 foods! The MASTER DIET PLANNER will help you plan a well-balanced diet, including options to restrict fats, cholesterol and salt, or to increase fibre intake at the same time offering maximum choice of foods. Instructions and Recipe Book included.

#### ALL PRICES INCLUDE POST & PACKING & VAT

We require good programs to increase our catalogue and pay high royalty rates for published material.

### CompuSoft

CS1-TOCCATA Music with a difference! Almost 9 minutes worth of BACH complete with a stunning visual display showing the 'shape' of the music for only £2.99. Cassette.

CS2-BANDIT A one-arm bandit program for only £2.99. Why pay 2 or 3 times as much for a program that offers no more than this full feature version. Cassette £2.99.

CS3-NURSERY RHYMES One of our best sellers. Just for the young. Words, pictures and music of the old favourites Hickory Dickory Dock, Polly put the kettle on, See-Saw Margery Daw and Baa Baa Black Sheep. Cassette £2.99.

CS4-SPACE MISSION SIMULATOR A new concept in space games. This is not the usual blast-em out of the sky type of game with endless successions of mindless aliens. In SPACE MISSION SIMULATOR you have to first answer the call to scramble and then fuel, arm and take off your space fighter. Only then can you deal with the aliens. After destroying the alien attack wave your performance is assessed and marked. Cassette £3.99.

CS5-OPTICS A full 'O' level revision course. This suite of programs comprises 16 sections (89K of code) that take you through the 'O' level syllabus. These programs are copiously illustrated with Ray diagrams that show and demonstrate the rules and laws that need to be learnt. Cassette £9.99, 40 track disc £12.99.

CS6-KEYS A powerful programming aid. KEYS reserves the bottom two lines of the screen to provide a visual reminder of the function of the 6 sets of the 10 programmed function keys that this program provides. Each bank of function keys is very rapidly selectable and is grouped with similar functions kept together. Thus, for example, you will find MOVE, PLOT, VDU, GCOL, CLS, CLG and COLOUR all available together. This program is supplied on cassette and is programmed for use on both Tape and Disk based systems. £2.99 cassette.

CS7-SCREENPLAY Now you can control the shape of the music. SCREENPLAY allows you to preset the tempo, volume and vibrato of the music with the display colours, width, height and spacing set for any of the four selectable basic patterns. Alternatively if you wish you can let the computer choose a display pattern for you. Four Scott Joplin music files are provided: The Entertainer, Pine Apple Rag, Maple Leaf Rag and Solace. Cassette £4.99. 40 track disk £7.99.

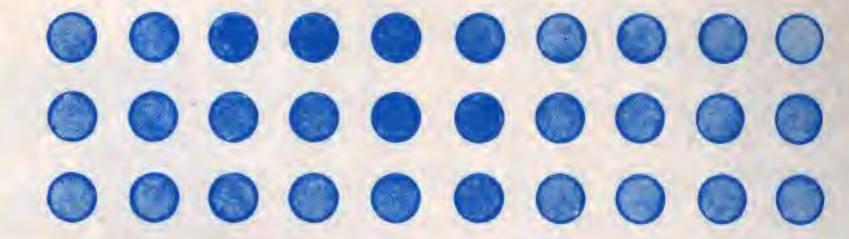
All the above prices are inclusive of post and packing.

We pay much higher commission rates than the big companies. Why not let us review your latest program.

32 Watchyard Lane Formby

CompuSoft Ltd., Liverpool L37 3JU

# computer market



JOYSTICKS (£1.00 p&p)

#### CENTRAL NOTTINGHAM

MICRONET 800 MODEMS **MODEM 1000** £69.95 MODEM 2000 £84.95 **BBC ROM COMMUNICATIONS PACK** £19.95 MICRONET 800 AND PRESTEL NOW ON DEMONSTRATION JOIN MICRONET 800 AT COMPUTER MARKET

PRINTERS (£7 carriage) SEIKOSHA GP100A £205.00 EPSON RX80FT £329.00 SEIKOSHA GP700A COLOUR PRINTER (7 colour text and hi-res graphic printer) £430.00 SCREEN DUMP TO GP700A £9.95 JUKI DAISYWHEEL

PACE DISC DRIVES £7 carriage) Compatible with all single and double density interfaces Prices include cables and mannual 100 K £212.75 200 K £270.25 The real AMCOM disc interface £99.00

The NEW KENDA PROFESSIONAL double density interface (doubles the above disc capacities). Features include up to 379 files/disc. Uses no £138.00

USER RAM, no hidden extras (fitted free if drive & interface bought together)

Add a PROGRAMMABLE INTERFACE £9.95 (allows even non joystick games to be played) with any of the following self centre joysticks QUICKSHOT I (moulded grip with fire buttons on top and base) £9.95 QUICKSHOT II (moulded grip with trigger and top mounted fire button) £11.95 SUPERCHAMP (Top Trigger fire button & 10 feet retractable cable) £14.95

TAC-2 (the ultimate in smooth control) £18.95 ROMS WORDWISE £46.00 AIDS PROGRAMMERS UTILITY £16.50 VIEW £59.00 TOOLSTAR (PACE) £34.00 DISC DOCTOR £33.25 COMMSTAR (PACE) £34.00 GRAPHICS ROM £32.25

MONITORS CABEL COLOUR MONITOR £229.00 FIDELITY TV/MONITOR SUPERB QUALITY £249.00 (LEAD £5.00 EXTRA) PHILIPS GREEN £99.00 SANYO GREEN (with anti glare screen) £129.00

BOOKS The widest choice in the area. Over 30 BBC titles in stock. SOFTWARE by ACORNSOFT, BUG BYTE, PROGRAM POWER, SUPERIOR, ALLIGATA PLUS OTHERS - Over 100 different titles

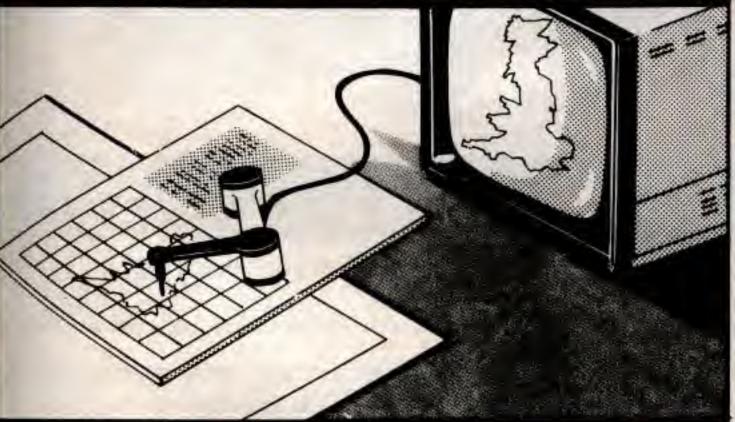
All prices include VAT.

27 GOOSE GATE. TEL: 0602 586454

# KODOL FIOHEK

£429.00

INC. VAT CARRIAGE £3.00



- \* FOR BBC MICRO MODEL B CASSETTE OR DISC
- ★ ENABLES PICTURES TO BE DRAWN OR TRACED
- ★ WORKS IN ANY GRAPHICS MODE COLOUR SELECTABLE
- ★ DESIGNED BY A TEACHER FOR EDUCATIONAL USES BY STAFF AND PUPILS
- \* TRANSPARENT TABLET ALLOWS DIAGRAMS AND MAPS, ETC. TO BE COPIED
- \* ROUTINE INCLUDED TO SAVE QUICKLY TO DISC OR CASSETTE
- ★ SCREEN DUMPS FOR EPSON AND SEIKOSHA PRINTERS
- \* TRIED AND TESTED DIRECT FROM THE MANUFACTURER

#### **COMMANDS FOR:**

LINES CIRCLES RECTANGLES INFILLING **COPY AND MOVE** 

PRINT AT AS WELL AS TRACE MODE

or please debit my Access/Barclaycard ..... Name ..... 

GOVERNMENT AND EDUCATIONAL ESTABLISHMENT OFFICIAL ORDERS WELCOME



COMPUTER DEVELOPMENTS LIMITED

NATIONAL INDUSTRIAL ESTATE **BONTOFT AVENUE, HULL HU5 4HF** TEL: (0482) 448562.

SPECIAL ROM SER OFFER MICRO USER

# The

# Advanced User Guide

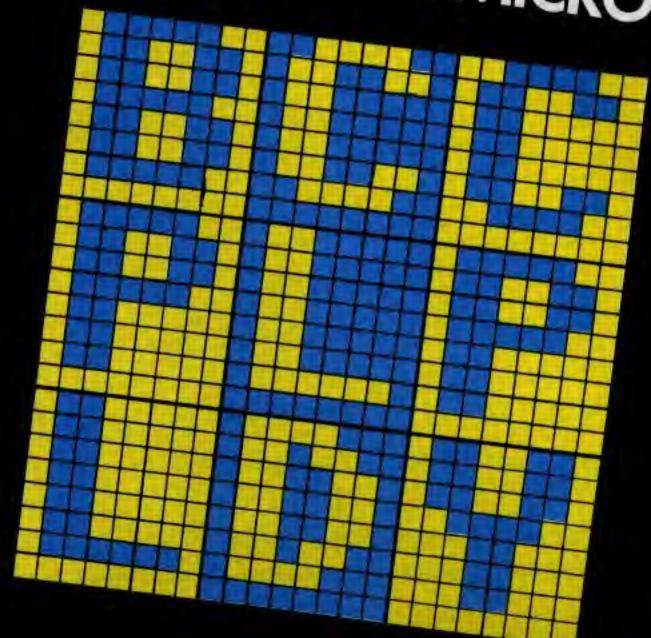
The essential companion for the BBC Micro.

Featured in its 512 information packed pages are

- \* the BASIC Assembler
- ★ 6502 machine code reference section
- \* complete descriptions of all FX calls
- ★ BBC memory usage and vectors explained
- ★ full interfacing details for the user port, tube, analogue port, 1 MHz bus
- ★ paged ROMs explained
- \* and lots, lots more

With many examples to illustrate the text, this guide is the indispensable reference work for the serious BBC micro programmer.

# THE ADVANCED USER GUIDE FOR THE BBC MICRO



BRAY, DICKENS & HOLMES

ONLY

## ORDER BY POST TODAY!

Please send me ...... copies of The Advanced User Guide at £13.95 (inc. p&p) TOTAL £ ......

...........

□ Access/Mastercharge/Eurocard

□ Barclaycard/Visa □ American Express

Card No.

Expiry date

061-480 0171

Send to: Micro User, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. (No stamp needed if posted in UK).

Or you can order by phone quoting credit card number and expiry date.

Please indicate method of payment ( )

☐ Cheque/PO made payable to

Database Publications Ltd.

**BBC Micro** 

## POOLS PREDICTOR

An easy to use, but very powerful Football Pools Prediction program for the BBC Micro. It combines six different techniques of forecasting based on a comprehensive analysis of current form. The program can easily be 'tuned', without any reprogramming, to improve forecasts as the season progresses. Also available for the 48K Spectrum.

£4.99

MAYDAY SOFTWARE

**181 PORTLAND CRESCENT** STANMORE, MIDDX HA7 1LR

#### SOFTWARE SERVICES

ROMGAMES PLUG 'EM IN - CALL 'EM UP!

SPIDERS - fast action arcade game - kill the giant spiders before they trap you - full sound and hi-score ladder.

CAT & MOUSE - simply the best maze game ever (not like pacman) beat time, the cat and the machine - machine code action.

OTHELLO - full feature graphics strategy game against the computer.

Available on ROM £9.95 Available on DISC £5.95 Available on CASSETTE £3.95

"SECURITY" still available at £15 from:

Dept. 1 Software Services, 65 South Mossley Hill Road, Allerton, Liverpool L19 9BG.

Trade enquiries welcome

## RICKSOFT Arcade Games \* Adventures Educational \* Utilities \* ROMS Languages \* and more Most from £1 per fortnight WITH OPTION TO With up to 25% discount Membershp £10

Tor catalogue and membership form send name

and address to

Ricksoft, Dept. L, 78, Warren Drive, Hornchurch,

Essex RM12 4QX.

Tel: (04024) 47722

#### **+**\*\*\*\*\*

Looking for a printer for listings, program development, etc. Look no further. Now you can use the ZX Printer with your BBC Micro by means of this new interface.

\* Built-in mains derived power supply.

\* Simply connects to the 1MHz Bus of the BBC Micro and the ZX Printer connector.

\* Full upper and lower ASCII characters.

\* Supplied complete with relocatable M/C software and full instructions.

\* Guaranteed 6 months.

Send cheque or P.O. for £29.95 or s.a.e. for further details.



Dealer enquiries welcome. Ideal for schools.

ZX Printers not supplied.

#### W.D. INTERFACES

12 Leabank Ave, Garforth, Leeds. LS25 2BL. Tel: Leeds 864328

#### DRIVE THE FLYING SCOTSMAN!

In our driver simulation game you can try to do just that.

Your task is to drive the Flying Scotsman from London. You must attempt to keep time despite some adverse conditions e.g:- Lineside Engineering works, signal checks and speed restrictions. If you fail to do so you may be relieved of the controls, or lose valuable points for the end of game performance rating.

You have a choice of three types of motive power, these being Deltic, Brush 47, and the H. S. T. varying from Ex-works condition to those due for attention.

Flying Scotsman for the B.B.C. 'B' is available from:-

**DEE-KAY SYSTEMS** 18, Salford Close, Woodrow South, REDDITCH, Worcs, B98 7UN

Price £7.50 inc. p&p.

#### WE CAN IMPROVE YOUR LANGUAGE

French, German, Russian, Spanish

CARSONDALE

Educational Programs of the Highest Quality for the BBC Micro (32K) supplied on cassette. (Electron users: write for details)



#### IRREGULAR/ESSENTIAL VERB SERIES

Thousands of verb forms at your finger tips for all abilities.

\* Choose your level

\* Multiple ways of use

Attractive colour formats

\* Full foreign characters

Full documentation

\* English meanings

\* Reference and browse \* Test with time limit

A truly remarkable achievement which allows you to study all those verb forms - an essential part of grammar.

IRREGULAR FRENCH VERBS: 150+ verbs, all non-compound tenses ESSENTIAL FRENCH VERBS: 80+ verbs, 5 tenses, retest, save test IRREGULAR GERMAN VERBS: 200+ verbs, 15 tenses! RUSSIAN IRREGULAR VERBS: 150+ verbs, optional stress, aspects

£15.99 £9.95 £11.96 £17.49

#### TEXT-FILL

In cooperation with D. Adshead, Birmingham University. Based on a most effective teaching method, these superb programs are ideally suited to the micro.

Highly addictive and effective

Upper and lower case foreign characters \* 20 texts supplied

\* Enter your own texts, store them on tape or disc.

All prices include VAT Add 50p p&p

Choose one of the supplied texts. It turns into hyphens and punctuation marks! Choose how much you wish to see, and fill in the blanks.

FRENCH TEXT-FILL: Also allows German and English texts RUSSIAN TEXT-FILL: Includes 10 advanced texts SPANISH TEXT-FILL: SAE for details.

£11.96

CARSONDALE ENTERPRISES LIMITED 44 Kingsway, Stoke-on-Trent, Staffs ST4 1JH.

#### Are you learning a foreign language?

#### POLYGLOT

This is one of the most sophisticated cassette tape based vocabulary learning systems yet devised for the BBC model B. The system records your test results with the vocabularies on tape, and keeps testing you on the words which you don't know, until you get them right. You may set up your own vocabularies, alter, delete or sort them.

Handles all accented letters and special characters needed for most West-Europeanlanguages, including French, German, Italian, Spanish, Danish, Dutch, Finnish, Norwegian, Portuguese and Swedish.

Suitable for beginners and advanced students. Needs OS 1.2 & 32K. £9.95 for programs, sample vocabularies in English-French, and a comprehensive ten page instruction booklet.

LEIGHTON EDUCATIONAL SOFTWARE Woodlands, Heath Park Road, Leighton Buzzard, Bedfordshire, LU7 8BB.

#### J.P. MAGNETICS LIMITED

HAVING TROUBLE OBTAINING QUALITY COMPUTER LENGTH CASSETTES?

WE CAN SOLVE YOUR PROBLEM

10 x C15 for £4.50 + 50p P&P

(CASH WITH ORDER) We are specialists in the supply of bulk custom wound audio/computer cassettes.

Trade and Educational Enquiries Welcome.

Competitive Rates - Price List Available.

Contact us now: (0274) 731651

Unit 4, - 7 Mary Street, Bradford, BD4 8SW.

#### RUNESMITH for BBC (32K) Micro

An adventure with a difference. Alter the story. Or guess what the gaps are made of. Achieve a Runesmith grade.

Be a magus with words. Load in the text provided, which is science fiction, erotic, metaphysical, written by Alan Marshfield: WYCH HAZEL ON THE PLANET TERROR. Or feed in your own text.

RUNESMITH is as flexible as your imagination. An adventure of the mind full of spice and invention. A tool for creative copy. An education.

The program RUNESMITH comes complete with WYCH HAZEL text files and 14 pages of documentation. Send £9.50 cheque or PO for complete RUNESMITH package.

ABRAXAS SOFTWARE, 13 Copthall Gardens, London NW7 2NG.

#### **DISC DRIVE OWNERS!**

Now is the time to use your expensive disc drives as something other than a very fast program loader.

DISC-DATABASE is a disc based filing system suitable for everyone. By using true RANDOM ACCESS FILING you are no longer confined to programs/data being a mere 32K.

Facilities include:-

\* The creation of your own tailor made database. \* Define your own screen layout. \* Search by any field. \* Search by full or part field references. \* Find, Display, Amend or Delete any record. \* Define your own print out summary.

The detailed manual supplied also shows how you can write and build into the main program your own additional routines which will not only enhance DISC-DATABASE but also help you learn how to get more from your disc drives.

Supplied on 40 track disc, complete with a comprehensive manual. Suitable for BBC Model B (Basic 2) with single or double disc drive. £11.50 including VAT. Cheque or P.O. to:-

S & B SOFTWARE 54 Wychwood Road, Wolds View, Bingham, Nottingham. NG13 8SB.

#### **PLINTHS**

Safely support your TV/Monitor or Printer above your micro with this sturdy mild steel plinth, your micro slides easily underneath when not in use, Disc Drives/Cassettes or general storage at the sides, a very useful addition to any micro user. Attractive texture finish in black or BBC colour match.

ONLY £28.75 Inc. VAT + £3.75 p&p

Trade Enquiries welcome - Allow 28 days delivery

#### **J&WBUNCE**

Unit 3, Crabtree Road, Thorpe Industrial Estate Egham, Surrey TW20 8RN Tel: (0784) 33556

#### TOP QUALITY PRINTERS! **ROCK BOTTOM PRICES!**

£189 + VAT SHINWA CP80 **EPSON RX80** £219 + VAT EPSON RX80F/T £248 + VAT JUKI 6100 Daisy-£328 + VAT wheel EPSON FX80 £328 + VAT £198 + VAT STAR DP515 EPSON MX100 £378 + VAT

EPSON FX100 £438 + VAT

**CUMANA DISK DRIVES** from £198 + VAT

We also have large stocks of sundries, etc.

**GEMINI 10X** 

For FREE BROCHURE and DISCOUNT ORDER FORM write now to: Datatech Ltd (TMU)

8 Bellingham Close, Bury, Lancs. BL8 2TU. Tel: 061-764 5579

## THE UPGRADE

by S.D. Ellington From: BIT TWIDDLERS If you already own the popular game of Killer Gorilla for the BBC Micro then 'Killa' will provide:

1. 15 levels of play.

Variable extended jump.

3. Climb and jump with hammer.

4. Extra lives after 25, 50 & 75 metres.

Practice mode.

Pause facility.

Start practice session at 'any height', 'any level'. Exercise your new powers and discover new routes. Have a go at the higher levels with a fighting chance.

Written by a professional programmer.

£2.75 + 50p p&p

BIT TWIDDLERS Dept MU/3, 158 Church End,

For disc compatible cassette by 1st class return post.

Harlow, Essex, CM19 5PF.

Now available on Micronet and from discerning shops

# S.P. ELECTRONICS

BBC Model B 1.2 O.S ...... £399 CP80 Printer + DELTA (inc. cable) ......£249 Disc Operating System ..... £85 Disc Drives ..... from £199 Disc Operating System D/Density .....£91.00 G3 WHO RTTY PROGRAM (TAPE) ...... £7.50 G3 WHO RTTY PROGRAM (EPROM VERSION) ......£20.00 Circuit board for RTTY decoder (inc. instructions) ) ........... £6.30 Star Delta 10X Printer (inc. cable) ...... £299.00 Joysticks (pair) self centering + analogue ...... from £16.00 Printer Cable (Centronics) ...... £12.90 Speech Synthesis ......£55.00 Disc Doctor ......£33.00 WORDWISE Word Processor ......£39.00

(all prices include VAT)

Wide selection of software; books, leads, plugs, etc. SAE for full list, All available Mail Order

Tel: 0602 640377

48 Linby Road, Hucknall, Notts. NG15 7TS.

Carriage extra

All prices apply

while stocks last.

£198 + VAT

## USICSU

#### MUSIC SPECIALISTS FOR THE 32K BBC MICRO \* THE SYNTH \* (0.S. 1.0+)

"A very flexible and inventive program that's highly recommendable." (Dr David

Ellis, E&MM, Oct 83)

This 'synthesizer' program has features which to our knowledge are unique. \* ALTER RHYTHM. The rhythm of a recorded melody may be altered by tapping \* REPEAT. No need to play a phrase twice, great saving in space.

\* REAL TIME PLAYING. With alteration of volume, envelope and octave pitch as

EDITING. Back and forwards whilst hearing the tune.

\* INPUT. May be hesitant or in correct time.

\* TIDY. 'Cleans up' inaccuracies of input on demand!

\* NUMBER OF NOTES. From 3000 for 1 channel to 1000 for 3, etc. Plus all that the other synthesizer programs do PLUS, IE sophisticated envelope editing (very easy), larger keyboard used (TAB to & cursor). No secrets, user transparent.

\* This is the program for the experimenter who wants to make HUMAN music rather than perform mathematical finger dexterity exercises.

THE SYNTH. Cassette & instructions only £8.75 inc. P&P. NEW

#### \* KEYBOARDS \* (0.S. 1.0+)

5 programs to turn your BBC into 5 real-time keyboards. 1. 3 simultaneous voices (in Basic for easy understanding) 2. Single voice M/C with Pitch Bend. 3. 3 simultaneous voice M/C with Envelope control built in. 4. Single finger Chord organ ranging over the whole keyboard, 2 variations for each chord. 5. Chord organ 2 with different chord configuration. These are all separate programs designed for you to use as they are or in your own programs.
KEYBOARDS cassette & instructions £5.75 inc P&P

\* MUSICTOOLS \* (all O.S.

"Musicsoft also produce an excellent 'Musictools 1' cassette . . . all in all, rather good value" (E&MM, Oct 83)

Five music utility programs on one tape.

Tune Generator with dynamic graphic Keyboard & Stave display, Envelope Command Explorer (Very easy to use), Musical Symbols Graphic routine, Simple single line organ with sophisticated controls. Over 60 procedures for you to use in your programs already in working programs.

MUSICTOOLS 1 cassette & instructions £5.75 inc. P&P.

\* PIEMAN \* (all O.S.)

"The best version of Simon I've seen, it goes so much further than most" (Quote by a rival software firm!) Recommended for Primary & Middle Schools. Not as simple as Simon! It develops into a fun set of ear cleaning and musical concentration games - from easy at infant level to impossible at graduation! Auto scoring.

PIEMAN cassette & instructions £5.75 inc. P&P.

ALL PROGRAMS TRANSFER EASILY TO DISC. Cheques and official orders to: MUSICSOFT, 12 Fallowfield, Ampthill, Beds.

Telephone: 0525 402701

If you require further information, please send S.A.E.

#### GARLAND COMPUTING

35 DEAN HILL - PLYMOUTH - PL9 9AF.

TELEPHONE: 0752 41287

#### **NEW BBC RELEASES**

LEARNING MATHS A series of programs for ages 9-12. Each package contains 3 to 4 programs, many with animations and entertaining games to help learn the principles of maths in school or at home. (Each Package £7.00)

Angles . Directed Numbers . Fractions . Co-ordinates and Lines . Symmetry . Motion Geometry . Sets . Elementary Statistics . Ratios

MUSIC TUTOR A unique and absorbing program which helps you to learn or create music. Notes can be entered in various ways, and the pitch and duration displayed on the screen on a treble clef. Other options allow you to play back, alter, make permanent copy and more. Full documentation (£10.95)

EDUCATIONAL GAMES Three programs which will provide fun for all the family and help to improve children's spelling, concentration or ability to estimate angles and distances. (Each £5.95)

Wordsquare . Pick-A-Pair . Sea-Battle

Prices include VAT and P&P. Available by mail order, or from selected computer stores and educational suppliers. Send for full details of our extensive range of educational software.

THE EDUCATIONAL SPECIALISTS

35 DEAN HILL . PLYMOUTH . PL9 9AF **TELEPHONE 0752 41287** 

## ke music with



#### Write your own compositions for the BBC microcomputer.

- full GRAPHIC display showing treble and bass staves
- VERSATILE SCREEN EDITOR with single key input
- up to 1200 note compositions on tape (600 on disc)
- SAVE your music/sound effects on disc or tape write in ANY KEY; sharps and flats are put in automatically
- up to 3 VOICES
- redefine up to 16 ENVELOPES
- HEAR the notes as you enter them
- completely compatible with the ENVELOPE GENERATOR program
- FULL DOCUMENTATION in USERS GUIDE
- PLAYBACK any tune/sound effect IN YOUR OWN **PROGRAMS**

32K required disc or tape OS 1.0 and above

£9.00 incl. vat

# SOFTWARE

enuelope generator

Create your own sound effects. Envelope Generator guides you through sound creation on the BBC microcomputer.

- interfaces directly with MUSIC EDITOR
- 16 special envelopes already defined
- SAVE envelopes for use in ANY program
- easy to use SCREEN EDITOR
- ACCURATE and matched amplitude and frequency graphs
- PRINTS both ENVELOPE and SOUND statements
- Hear the sound immediately
- step-by-step instruction in full USERS GUIDE

32K required disc or tape OS 1.0 and above

£7.00 incl. vat

Cash with order (Please specify disc or tape)

Dept P3 12 Collegiate Crescent, Sheffield S10 2BA

Strong

# Regardez!



#### LANGUAGE LEARNING AIDS FOR FRENCH, GERMAN & SPANISH

Already in use in numerous schools and colleges, these programs provide an immensely powerful aid to foreign language learning. The cassettes include extensive vocabulary lists arranged as a series of lessons, each covering a different subject. A tuition control program enables individual lessons to be loaded and used as required.

Words, phrases etc are presented first in one language, then the other complete with all necessary accents and special



characters. Masculine, feminine and neuter words appear in different colours to encourage gender learning. All lessons can be run in three different ways, i.e. learning only, self-test or speed and accuracy test.

The programs are suitable for pupils of all ages as simple commands enable new lessons in vocabulary or grammar to be entered by the user. These may then be edited as required and stored on cassette for later use. Invaluable for homework and exam revision!

Level A Cassettes: Contain the tuition control program and 16 comprehensive lessons for general vocabulary learning.

Level B Cassettes: Contain the tuition control program and 16 lessons including verb lists, adjectives, adverbs and phrases.

Available from dealers, large stores or mail order.

Also Available "THE SPANISH TUTOR"

Software

I Pilgrims Close, Harlington, Dunstable, Beds. LU5 6LX Tel: 05255 3942

Kosmos Software, I Pilgrims' Close,	Harlington, Dunstable, Beds LU5 6L
Please supply the following programs (BBC/SPECTRUM) (Prices include post The French Mistress Level A @ £9.95	tage & packing)
The German Master Level A @ £9.95  The Spanish Tutor Level A @ £9.95	The German Master Lavel B @ £9.95
Mr/Mrs/Miss	
Lenclose a cheque/postal order value (	

#### TWO WAYS TO ENSURE YOU GET

# THE MICHO MICHO WILLIAM EVERY MONTH

#### Complete and mail subscription form on Page 169

2. Hand this form to your newsagent.

Please rese	rve me a	copy of The	Micro User
magazine e	every mont	h until furth	er notice.

- ☐ I will collect
- □ I would like it delivered to my home.

Address \_\_\_\_\_

Note to newsagent: The Micro User should be obtainable from your local wholesaler, or contact the distributor – Wells, Gardner, Darton & Co Ltd Tel: Faygate 444

#### UROM FOR THE BBC MICRO

UROM is a utilities chip containing a number of useful routines in an 8K EPROM. It can be fitted to your machine in minutes and contains the following facilities:

•• MEMORY DISPLAY. Display hex and ASCII equivalents of any section of memory. Page forward and back. Change bytes. Dump to printer.

•• DISASSEMBLER. 6502 mnemonics, hex and ASCII equivalents. Page forward. Dump to printer.

\*\* BLOCK MOVE. Shift any section of memory to a new location in RAM.

\*\* FIND AND REPLACE. Find all references to BASIC variable or constant and give lines at which it occurs. Replace it with another, larger or smaller.

\*\* DISPLAY USER KEYS. The contents of the 16 user-definable keys are displayed.

\*\* SET UP KEYS. The keys are set up with commonly used functions.

•• EDIT ENVELOPE. Edit any of the envelope parameters quickly and easily. The new envelope is stored and may be played by pressing one key. Edit the corresponding 'SOUND' statement. A further utility displays the BASIC 'ENVELOPE' statement.

•• DEFINE CHARACTER. Quickly edit a single character in the ASCII range 224-255. The BASIC 'VDU 23' statement is given.

•• CURE 'BAD PROGRAM'. Restore a bad or corrupted program to the point where it can be listed and edited. Works on 'unlistable' programs, too.

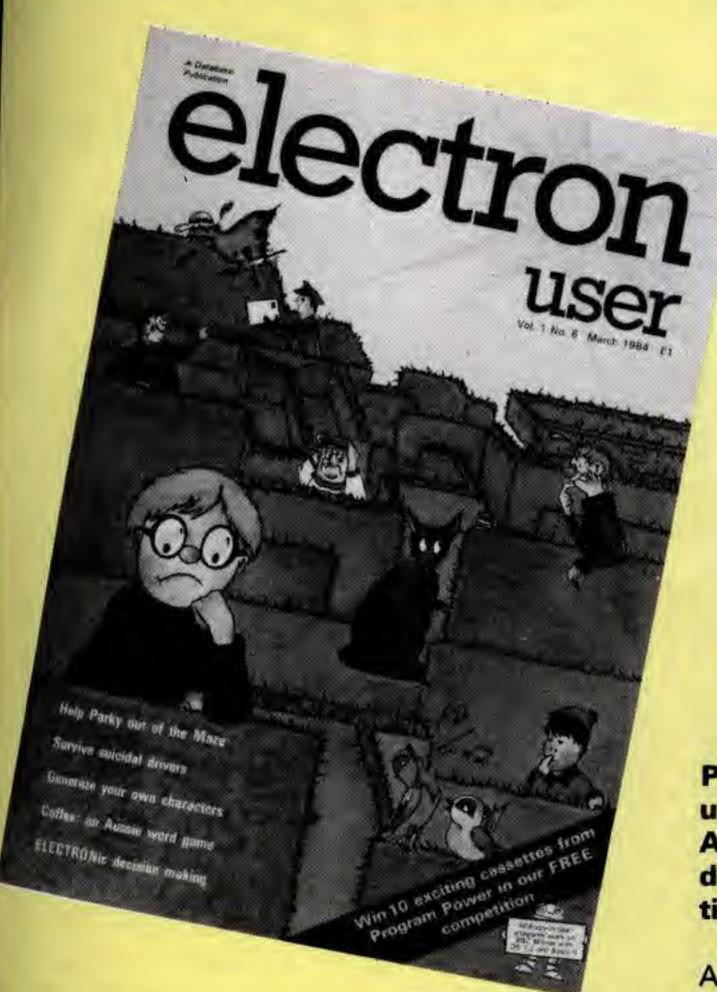
\*\* 6502 MONITOR. Display registers, stack, flags, current instruction and up to 8 selected memory locations. Continue execution to BRK, single step, skip instruction, set P-counter.

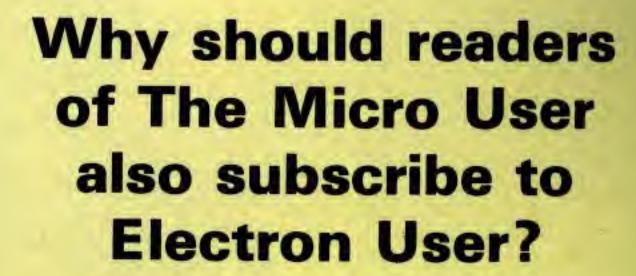
•• STRING SEARCH. Locate all references to a character or hex string in RAM.

Available now. Price includes full instructions, VAT and postage.

#### **PRICE £19.95**

J & H SOFTWARE, "The Elms", Sussex Road, Southport. PR9 0SJ.





The answer's simple ...

# LISTINGS!

Pages and pages of them. Games, graphics, utilities - plus regular features like Casting Agency and Sounds Exciting - all clearly defined to ensure you key in correctly first time.

ALL Electron User listings have been written so that they will also work without modification on a BBC Micro with OS 1.2 and Basic II.

If you have OS 1.2 with Basic I you may have to substitute certain semi-colons for commas. And if you have OS 1.0 or 0.1, you will find nearly all the programs will run without modification.

In the March issue you'll find action games, maze games, word games - in fact, all sorts of games! There's a character generator utility, graphics demonstrations, fast circles, a decision taker and lots more. And they all work on the BBC Micro!



SUBSCRIPTION FORM
Syecial introductory offer inclusive price of £1

SUBSCRIPTION FORM

Syecial introductory offer inclusive price of £1

Name

Name

#### SPECIAL OFFER!

FREE cassette of 26 programs from the first four issues of Electron User

- worth £3.75

- order NOW!

Expiry Date -

Cheque/P.O. made Payable
Cheque/P.O. made Publications.



micro computer systems for all applications

we supply, support, and service:

LISA

Apple II, III.

Torch

Acorn Electron

Acorn Econet

Fibre-Optic

Networks

Newbrain

Sinclair

**B.B.C.** Computers.

TRAINING SOFTWARE SUPPORT - CAL primary

and middle school, graphics design,

programming, accounts

training packages, professional accounts,

e.g. - legal,

estate agents etc.



ADMINISTRATIVE SOFTWARE SUPPORT - Timetabling and options, database records and filing packages, word processing, accounts.

Visitors are invited to evaluate and test LISA, and B.B.C. econet. please contact: GARETH LITTLER or MARK HOWARD

#### EDUCATION & TRAINING DIVISION.

Northern Computers, Churchfield Road, • FRODSHAM, CHESHIRE WA6 6RD Tel: (0928) 35110 •

### BJSOFTWARE FOR THE BBC MICRO Home Accounts & Mail Order Club Controller

Use its 150 Bank/Customer Accounts & 25 Standing Orders to control your household incomings & outgoings, or a Mail Order Catalogue Club's finances.

Turn to Page 1 for Receipts, 2 & 3 for Paying out & Standing Orders, 4 & 5 for Transfers &

Setting up accounts. Page O files your Data for next time.

Page A turns the Computer into a Calculator, and 6, 7, 8 & 9 Display the Bank/Customer Accounts, a full List of Transactions sorted by date just like your bank Statement, the 15 Controlled Accounts (to keep a close eye on chosen items of expenditure like a Budget Account) & a "Profit & Loss" statement for each month.

All pages show the date & amount of memory left, the Display Pages appropriately use green or minus red figures, & the Epson routine provides Hard copy when P is pressed.

Full error check and well documented, with a 300 Baud Back up copy to ensure easy loading, a very user-friendly and useful program indeed.

£6.00 to B.R.A. Joynes, 26 Fore Hill Ave, Bessacarr, Doncaster, DN4 7EU

#### AMPEX 120 US FERRIC BLANK CASSETTES

The ultimate ferric tape

C5 Quantity 1-9 35p 10-24 33p

25-49 25p

C10 Quantity 1-9 39p

10-24 37p

25-49 28p

C15 Quantity 1-9 46p

10-24 44p 24-49 33p

Carriage 1-9 50p - 10-24 £1 - 24-49 £1.50

FAIRMORN RECORDING
4 RECTORY LANE, BIRMINGHAM B36 9DH
021-747 3837

#### **ADVERTISERS INDEX**

A & F Software	144	Leighton Educational	184
A.M.S.	111	Level 9 Computing M.R.M. Software	62 26
Aardvark Abraxas Software	80 184	M.W. Systems	98
Acornsoft	16, 17, 143	Mail Order Micros	92
Advanced Digital Systems		Mayday Software	183
Advanced User Guide	182	Micro User Show	120, 121
Alligata Software	130	Microage Electronics	24, 25
B.R.A. Joynes	188	Microaid	173
BBC % Club	84	Microbyte Software	75
BBC Microcomputer Syste	m 119	Micronet 800	56
Bit Twiddlers	184 190	Micropower 15, 23, 31 MicroPulse	1,63,157,192
Bridge Software C-Tech	38	Microtraffic Systems	32
C.C.S.	156	Microvitec	49
C.M.S.	140	Microworld	126
Cambridge Computer Consu	Itants 37	Micro/TV Adaptor	148
Cambridge Computer Stor	e 190	Midwich Computers	39
Carson Developments	92	Multiplex Computers	172
Carsondale Enterprises	183	Musicsoft	185
Chase Data	91	N.M.C. Nikam Electronics	136, 137 140
Clares Micro Supplies Commotion	171	Northern Computers	161.188
CompuSaft	180	O.I.C.	75
Computer City	191	Oakleaf Computers	71
Computer Concepts	2, 22, 165	Optima	74, 162
Computerama	3	Opus Supplies	54, 61, 94
Computermarket	181	P & H Electronics	7
Computertown	128, 129	Pace	95
Contex	148	Paen Systems	179
Cortex Computers	173	Park Software	155
Cumana	103, 112	Primasoft Printerland	156 171
D.A. Computers D.R.G.	140	Psion Software	6
Datapen	180	Qual-Soft	179
Dataplus	27	R.D. Laboratories	146
Datatech	184	Redshift	67
Dataware	190	Remedian	148
Dedicated Microprocessor	s 60	Ricksoft	183
Dee-Kay Systems	183	Robot Computer Develop	
Doctor Soft	58	S & B Software	184 184
Dynabyte Software	174	S. P. Electronics Silent Computers	172
Ebley Micro Peripherals Electronequip	20,21	Silverlind	180
Everyday Electronics	156	Simon W Hessel	72
Fairmorn Recording	188	Simonsoft	147
G.C.C. (Cambridge)	139	Sir Computers	158
G.S.L.	30,90	Softsmith	174
Garland Computing	185	Softspot	50
Gemini	12	Software for All	135
Golem	190	Software Invasion	18 183
H & H Software H.C.R. Electronics	150 148	Software Services Software Supermarket	68
Home & Business	14	Solidisk	13
Hornby Software	189	Swift Machine	150
Imagine Software	170	System	185
Integrex	167	Technomatic	8, 9, 10
International Video Game	Comp 19	Tekform	60
J & H Software	186	Twillstar Computers	29
J & W Bunce	184	Universal	100
J.P. Magnetics	184	Communications Compa Viglen	87, 100, 101
John Wiley & Sons Jonsoft	149 171	Voltmace	114
K.N. Developments	92	W.D. Interfaces	183
Kansas City Systems	138	Walrus	172
Kay-Ess Computer Produc		Warex Soft	155
Kosmos	186		43, 44, 45, 46
Leigh Computers	180	Wordsworth, Ian Copesta	ske 147
The state of the s	The second secon		

# GAMIS WANTED

"Everyone has got at least one novel inside him, and every BBC Micro owner has at least one original game waiting to be programmed." – Zen in the Art of Computer Programming.

So says our editor in his forthcoming book. Is he correct though? Have you got a games program locked away in your subconcious, just waiting to see the light of day?

If so, get in touch with us right away – we're only too willing to hear from you. And we've got our team of experts ready to help evaluate your work and add any necessary finishing touches.

Of course, if it's good enough, we shall want to include it in the pages of BBC Micro User. So send a copy of your original games program, on cassette or disc, to:

The Editor, Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport.

And please mark your envelope clearly "GAME".

# HORNBY

Britain's top
Spectrum Pro-Golf Series now
available for the first time on
BBC Model B 1.2 O.S.

The real thing, exact simulation of Britain's top golf courses.

- All golf rules apply.
- 2. Designed for one or two players.
- 3. Played off any handicap.
- 4. On each hole, distance, par, green enlargement.
- Control shot choice of all clubs, strength, direction.
- 6. Graphics excellent.
- 7. Extremely realistic.

TROON £7.75 NEWBIRKDALE £7.75
WENTWORTH EAST & WEST COURSE £11.00

All prices include VAT & P&P

Available from:

HORNBY SOFTWARE
21 Pinfold Hill, Leeds LS15 0PW.
Telephone: 0937 65847

#### **EBLEY MICRO PERIPHERALS**

LOOK! Best yet sideways ROM Board Produced 16 ROM Sockets – Can be mounted inside or outside BEEB or available in own case.

Prices from £39.95 full details on request.

COMPUTERS BBC Model 'B'	£346.95
BBC Model 'B' with Disc Interface	£407.80
4 Colour Printer Plotter CP 80 Type I	£108.50 £194.00
Star Gemini – 10X Star Gemini – 15X	£205.00 £335.00
Star Delta – 10 Riteman	£335.00 £220.00
DAISYWHEEL PRINTERS	£270.00
Daisystep 2000 Juki – 6100	£399.00
Cased with power supply, cables and	d manual
40 Tk S-S 100k 80 Tk D-S 400k	£188.00 £282.00
Twin 80 Tk D-S 800k Bare drives available from	£528.00 £125.00
MONITORS Colour Caol CE 370A	£190.00
SCM 14 N Mono – from	£197.50 £66.00

Add carriage and VAT to all prices

Carriage – Printers, Disc Drives, Monitors and Computers £7

Rom Boards £1

#### **EBLEY MICRO PERIPHERALS**

191/193 Westward Road, Ebley, Stroud, Glos. GL5 4SX Telephone (04536) 79446

# Teachers!

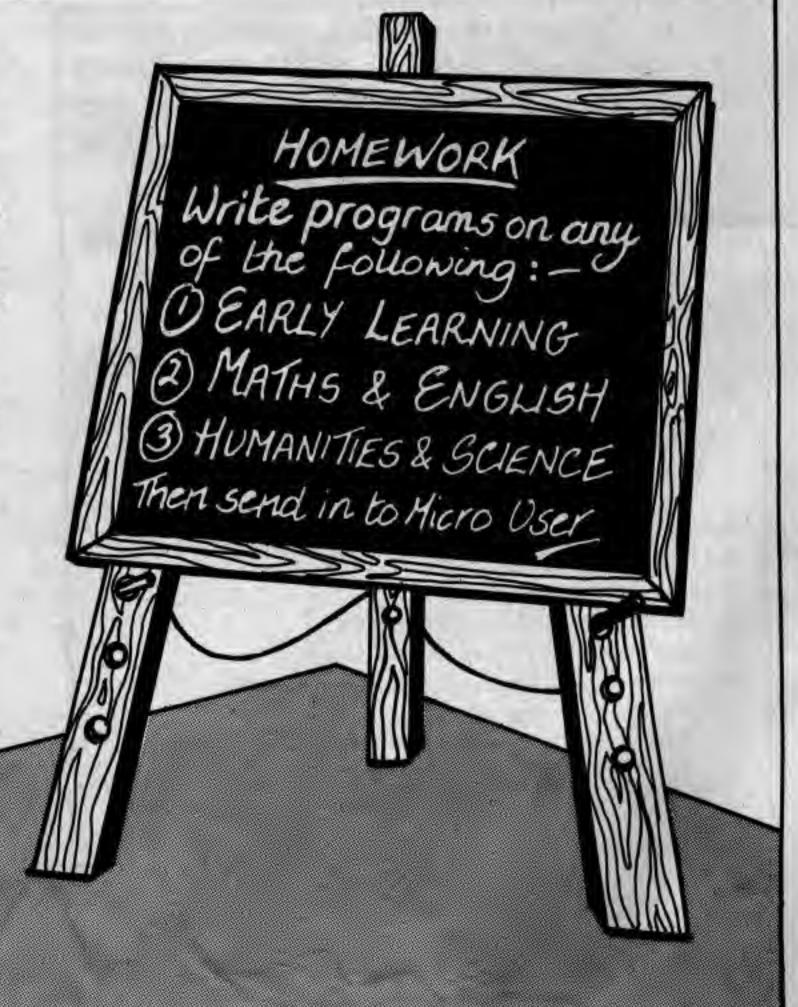
Don't confine your great ideas to your own classroom. Why not share them with your colleagues through the pages of *The Micro User?* 

Each month from now on we'll be devoting articles to the use of the BBC Micro in education. As you can see, we've started in this issue with lan Murray's article on user-friendly software and the excellent number balance program.

And our educational coverage won't be just pious theory – we'll be carrying programs you can try out in your own classroom.

To do all this, we're going to need your help. We need your programs, ideas and opinions. Why not send them to us at:

Classroom Corner The Micro User Europa House 68 Chester Road Hazel Grove Stockport SK7 5NY.



#### **BBC/ELECTRON SOFTWARE**

QUALITY SOFTWARE PRODUCED BY PROFESSIONALS.

#### EDUCATIONAL

Our educational software is used in hundreds of schools and homes throughout Great Britain.

#### **EDUCATIONAL 1 BBC/ELECTRON**

£8.00

Hours of fun and learning for children aged 5 to 9 years. Animated graphics will encourage children to enjoy maths, spelling and telling the time. The tape includes MATH1, MATH2, CUBECOUNT, SHAPES, SPELL and CLOCK.

... An excellent mixture of games, offering various levels of difficulty and speed of responses. Entertaining enough to keep young children's attention and, on the whole, well-designed enough to help them learn while enjoying themselves ... Personal Software - Autumn 1983.

#### **EDUCATIONAL 2 BBC/ELECTRON**

£8.00

Although similar to Educational 1 this tape is more advanced and aimed at 7 to 12 year olds. The tape includes MATH1, MATH2, AREA, MEMORY, CUBECOUNT and SPELL.

#### FUN WITH WORDS BBC/ELECTRON

£8.00

Start your fun with alphabet puzzle in GUESS A LETTER. Continue your play as you learn about VOWELS, know the difference between THERE and THEIR and have games with SUFFIXES. After working so hard reward yourself with games of HANGMAN.

#### \*\*\* SPECIAL OFFER \*\*\* BUY ALL 3 CASSETTES AND DEDUCT £4.00

Add 50p per order for postage and packing.

Cheque/P.O. to.

GOLEM Ltd, Dept B, 77 Qualitas, Bracknell, Berks, RG12 4QG. Telephone: (0344) 50720

For full catalogue giving details of games and utilities software for the BBC/ELECTRON apply to the above address.

# SPELLWISE

IS YORE SPELING REELY ATROSHUS? Or is it just a littel bit off kei? In either case you need

SPELLWISE.

is a spelling checker for use with your BBC micro and WORDWISE word processor

is a DISC or tape based machine code program with comprehensive user manuals

contains an expandable dictionary of over 6000 words (disc) or 3000 words (tape)

SPELLWISE diligently checks every word in your text against the SPELLWISE dictionary. When it has finished you will be left with a list of words which are incorrectly spelt or not in the base vocabulary.

The program can be interrupted at any stage for inspection of the remaining word list and for the insertion of personal or specialist vocabularies. For this purpose software is included to enable you to create your own data files.

SPELLWISE comprises a set of one disc (or two tapes) plus a complete user manual. The tape version is limited to cassette recorders with motor control. SPELLWISE costs £12 on tape, £18 on disc and can be obtained from:-

DATAWARE FREEPOST SWINDON SN3 4BR

# THE NIGHT SKY

(for BBC micro Model B)

An observer's guide to the stars visible from anywhere between 66°N and 66°S

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with THE NIGHT SKY and your BBC micro

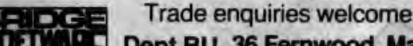
- Features over 1000 different stars
- 5 magnitudes distinguished
- 87 constellations identifiable
- Many millions of different skyscapes
- Sky colour indicates day, night or twilight
- Ideal for serious astronomers and novices alike

Make your TV screen a mini planetarium

Trace the movements of the constellations minute by minute, night by night

Send £9.90 for cassette and Manual

Send s.a.e. for full list of our scientific educational, graphics and games software for Spectrum, ZX81 and BBC micro Full money back guarantee.



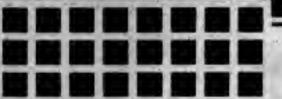
Dept BU, 36 Fernwood, Marple Bridge, Stockport, Cheshire, SK6 5BE, England.

Emmanuel St.

Our new Personal Computer Centre specializing in the BBC Micro with complete support

we know computers

**Business &** Professional



Home & Educational A

Cambridge Computer Store

1&4 Emmanuel Street, Cambridge

THE COMPUTER CAPITAL OF THE NORTH 78 VICTORIA ROAD, WIDNES, CHESHIRE. 051-420 3333

MISCELLANEOUS Amcom DFS Acom DFS L-DOS Speech Synthesis EBC Joystick	£95.00 £89.00 £90.85 £55.00 £16.95	Dust Covers from Disk Box (40) Disk Box (60) Prolink Interface (Joystick)	£19 40 £27 90	Single Drives Single Sided 40 Track (100k) £212.7 Double Sided 40 Frack (200k) £270.2	Double Sided 40	Beebcalc £3 DiscDoctor £3 Gremlin £3	PRINTERS  \$4.85 Seikosna GP100 £199.95  59.00 Seikosna 250X £249.95  53.85 Star DPE10 £280.00  53.85 ShinwaCP80 £270.00  59.00 Epson RX80 £310.00
Outskahet Licytron Recorder	£19.95 £29.95	MONITORS		Double Sided 40/80 Track (400k) £350.7	Double Sided 40/80 Track (800k) £665.85	Aid £2	28.00 Epson FX80F/T £340.00 34.45 Epson FX80 £430.00
DR101 Recorder Light Pen ATPL ROM Board Parallel Cable	£44.85 £27.00 £44.85 £11.00	Cabel 14" Microvited 14" M1431 Microvited 14" M1451 Microvited 14" M1441	E373 00	Double Sided 80 Track Only (400k) £327.7 Single Sided 40/80	Single Sided 40/80	Gemini Database 13 BBC HARDWARE Electron 519 BBC Model B 539	39,95 Juki 6100 . £435.00 Smith Corona £395.00 99.00 * Star Buy
Serial Cable Liating Paper (2000)	£11.00		£125.00	Track (200k)		BBC Model 8/DFS £46	59.00 P&P on Hardware 25.00 £5.00

5-a-SideSoccer ...... £7.50 PontoonandPatience..... £7.50

The French Mistress

The French Mistress

German Master

German Master

LevelA ..... £9.95

LevelB ...... £9.95

LevelA ...... £9.95

LevelB ...... £9.95

WITICIEIODOWOO
NEW FellxintheFactory£7,99
NEW Felix and the Fruit
Monster £7.99
Moonraider(B) £7.99
Swoop(B) £7.99
Galactic Commander
(B)£7.99
Timetrek(B) £7.99
LaserCommand(B) £7.99
Constellation(B) £6.85
KillerGorilla(B) £7.99
Croaker(B) £7.99
Chess(B) £7.99
Adventure £7.99
Painter(B) £6.85
CowboyShootout(B) £6.85
MoonBaseAlpha£7.99
DangerUXB
The state of the s
Draw£10.30
Where £6.85
Chemistry £6.85

#### -SPECIAL OFFER-£1.00 off 2 Cassettes £2.00 off 3 cassettes etc.

WorldGeography ...... £6.85

JuniorMathsPack ...... £6.85

NEW Hell Driver ...... £7.99 Martian Attack ...... £7.99

GEM	NI SOFTWARE
Stock Con	trol £19.95
	Statements £19.95
Spread Sh	eet £19.95
Home Acc	ounts £19.95
	£19,95
Graphplot	£19,95
Mail List	£19.95
Database .	£19.95
Missile Co.	ntrol £9.95
Sleigh Bell	s £9.95

Music Processor	£14.95
Beeb Art	£14.95
Protector	£7.95
Wizard	€6.95
Mined Out	The second second
The Generators	

PhilosophersQuest £9.5 SphinxAdventure £9.5 CastleofRiddles £9.5 Monsters £9.5 Snapper £9.5 Snapper £9.5 Planetoid £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 Superinvaders £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 NumberBalance £9.5 WorldSequencing £9.5 WorldSequencing £9.5 WorldSequencing £9.5 MissingSigns £9.5 Jars £9.5	Manner	00.0
SphinxAdventure £9.5 CastleofRiddles £9.5 Monsters £9.5 Snapper £9.5 Snapper £9.5 Planetoid £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 StarshipCommand £9.5 StarshipCommand £9.5 StarshipCommand £9.5 StarshipCommand £9.5 WorldSequencing £9.5 WordHunt £9.5 WordHunt £9.5 MissingSigns £9.5 Sentence Sequencing £9.5 Sentence Sequencing £9.5		
CastleofRiddles £9.5 Monsters £9.5 Snapper £9.5 Snapper £9.5 Planetold £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 SuperInvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 NumberBalance £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Sentence Sequencing £9.5 Sentence Sequencing £9.5		
Monsters £9.5 Snapper £9.5 Planetoid £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 WorldSequencing £9.5 WorldSequencing £9.5 MissingSigns £9.5 Sentence Sequencing £9.5 Sentence Sequencing £9.5		
Snapper £9.5 Planetold £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 NumberBalance £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Sentence Sequencing £9.5 Sentence Sequencing £9.5		
Planetold £9.5 RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Jars £9.5 Sentence Sequencing £9.5	the state of the s	
RocketRaid* £9.5 Meteors £9.5 Arcadians £9.5 Superinvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Sentence Sequencing £9.5 Sentence Sequencing £9.5		
Meteors £9.6 Arcadians £9.6 Superinvaders £9.6 MissileBase £9.6 StarshipCommand £9.6 Countdown/Doom £9.6 Snooker £9.6 WorldSequencing £9.6 WordHunt £9.6 MissingSigns £9.6 Jars £9.6 Sentence Sequencing £9.6		
Arcadians £9.5 Superinvaders £9.5 MissileBase £9.5 StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 NumberBalance £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Jars £9.5 Sentence Sequencing £9.5		
Superinvaders		
MissileBase		
StarshipCommand £9.5 Countdown/Doom £9.5 Snooker £9.5 NumberBalance £9.5 WorldSequencing £9.5 WordHunt £9.5 MissingSigns £9.5 Jars £9.5 Sentence Sequencing £9.5		
Countdown/Doom £9.9 Snooker £9.9 NumberBalance £9.9 WorldSequencing £9.9 WordHunt £9.9 MissingSigns £9.9 Jars £9.9 Sentence Sequencing £9.9		
Snooker		
NumberBalance		
WorldSequencing £9.9 WordHunt		
WordHunt		
MissingSigns		
Jars £9.9 Sentence Sequencing £9.9		
Sentence Sequencing £9.9		
LispCassette* £16.8		
ForthCassett £16.8	LispCassette*	£16.8

BBC	
And are all the world of the Contract	
SOFTWARE	
HomeFinance	£10.00
Painting	
Drawing	
GamesofStrategy	£10.00
FunGames	£10.00
NEW	121111
WhiteKnight	£11.50
Dr. Who Adventure	£10.00
Canyon	
Toolbox	

Missile Control £9.95 Sieigh Bells £9.95	Canyon £10.00 Toolbox £21.00
PRICE AIN TURN	
'A LOUIN	YOUR BBC
INTO A	BUSINESS NE WITH A
TORCH D	
£820 incl. VAT	& FREE delivery
NOW WITH SER	REE SOFTWARE

		- 27
-	PERFECT	CALC
ı	PERFECT	WRITER
Ŧ	PERFECT	FILER
Ŧ	PERFECT	SPELLER
- 1	ORCHNE	T
- 1	TINAANIE	COLTMAN

Valued at over £1,000

\$ .5	TWARE
Frogger	£7,95
NEW - NEW Hunchback ColditzAdventu Qbert	re £7.95
Crazy Painter 2002	£7.95 ure £7.95

Simon Hessel	
	€5.95
Inheritance	€6.95
The World Travel	
Game	€6.95

#### SOFTWARE CITY

Call in and see our new shop within a shop (free parking/M62 Exit 7) Please ring or write for a full catalogue and special discount offers.

	DOCTOR SOFT
	tSimulator £8.95
Kremlin.	£6.95

DOCTOR SOFT	M: ne i solimunt i L	
747FiightSimulator £8.95* WolfPackill £6.95 Kremlin £6.95 Harmony £7.95	180	
TablesTeacher£9.95	Chuckie Egg £8.00	

D ::::::E

#### LOWEST DELIVERY RATES IN BRITAIN

#### COMPUTER CITY SERVICE CENTRE

Authorised service centre for Acorn, Apple & Dragon.

Repair, maintenance and extended warranty available for many other computers and peripherals.

#### BOOKS FOR THE BBC MICROCOMPUTER

Assembly Language gramming for BBC! BBC Expert Guide! Graphics & Sound! Advance Programming	£8.95 £6.95	Creating Adventure Progs BBC Easy Programming The BBC Using Floppy Discs	£6.95 £5.95
Tech	£7.95	with BBC	€9.95
		1 - 11	- A

CREDIT FACILITIES Ask about instant credit up to £1,000.

63	VIRGIN
IUK	Space Adventure £7.95
Star Trek/Candy	Trench £7.95
Floss £6.50	'Owzat £7.95
	Cheftain £7.95
Hangman £4.50	Noc A Bloc £7.95
SuperHangman £4.50	Cruncher £7.95
Atlantis £7.50	Microbe £7.95
Flags £4.50	Bug Bomb £7.95
LeanFron C7 50	and and the continuent of the

VISION SOF	TWARE	
Disc Executor		£11.00

MELBOURNE HOUSE

Plank Walk ...... £7.95

1		
V)	SHIVA SOFTWARE	
1	Lauching	£14.95
	Additional Fun	£14.95
u	Sets & Operators	£14.95

The Hobbit ...... £14.95

SpaceInvaders	2
Galaxy Wars	. 2
CityDefence	2
Synthesizer	2
SeaLord	£
Oblivion	27
GraphicsPackage	. E
Old Father Time	

HAH SOFTWARE			
Alphabets	£14.50		
Billiards			
Shape& Race			
Signals& Magic.			
EarlyOne			
Early Two			
EarlyThree			
ExtraOne	£4.50		
ExtraTwo	£4.50		

Early Two
E DIGITAL E PANTASIA
ADVENTURE GAMES FOR

ADVENTURE GAMES	FOR
TheGoldenBaton	(A/B)
TheTimeMachine	(A/B
ArrowofDeath(Pt1)	(A/B)
ArrowofDeath(Pt2)	(A/B)
EscapefromPulsar7	(B)
Circus	(B)
Feasibility Experiment	(B)
TheWizardofAkyrz	(B)
Perseus&Andromeda	(B)
TenLittleIndians	(B)
ALL ADVENTURES	

ROForth	
RQ ForthToolKit	LONG THE RESERVE THE PARTY OF T
ULTIMATE ADVEN	A STATE OF THE PARTY OF THE PAR
Snowball	
AdventureQuest	£10.00
DungeonAdventure.	
Colossal Adventure	
Lords of Time	£10.00

Send S.A.E. for further details and quote for any product

	MAIL ORDER	VISA
Please send n	10	
1		
2	***************************************	***************************************
	***************************************	
	****	
	packing on software 50p. Phone for	
I enclose che	que/P.O. for	
OR please det	oit my Access/Barclaycard/Visa*	
Card No	Expiry date	************
N 1 T 1 T 1		
No. of the Contract of the Con		
	Code	
Carlotte Control	***************************************	
Dealers Disco ACCESS, BAR 24HR 051-420	unt Available RCLAYCARD VISA ORDERS WEL 1 3333	COME ON
	CITY Dept F. FREEPOST (No Sta Victoria Road, Widnes, Cheshire	

LARGEST SELECTION OF SOFTWARE IN GREAT BRITAIN COURTESY OF TIGER DISTRIBUTION. OVER 700 LINES OF SOFTWARE FOR ALL LEADING MICROS

